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MOUNT McKINLEY'S TWO PEAKS FROM THE EAST

Denali Pass is between the South Peak (left) and the North Peak (right), here seen from an airplane at 14,000 feet. A 13,000-foot cliff rises from the head of Traleika Glacier in the foreground

Photo, B. Washburn

THE

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VOLUME VII APRIL 1948 NUMBER 1

An Appeal to Reason

WALTER A. WOOD

ELEVEN persons are known to have been killed in North American climbing accidents during 1947. As many more may have died in accidents not yet reported to the American Alpine Club. But for the intervention of Providence, accidents involving other climbers might have swelled the appalling number of fatalities. What are the causes of these tragedies, and what can be done to minimize their recurrence in 1948 and in future years?

Mountaineering accidents do not happen; they are caused. Those fatalities which result from acts of God—the death of the guide Emile Rey is an example—are so rare as to be negligible; and to account for the swelling tide of mountain tragedies we need look no farther than the horizon of our own human behavior. In what respect is our behavior at fault?

An analysis of the accidents in 1947 shows that every accident, whether fatal or non-fatal, can be ascribed to "climber error"; that in every accident, individual or collective, the margin of safety had been exceeded; that in eleven accidents sound mountaineering judgment had been disregarded; and that in eight accidents inexperience led directly to disaster. It is, of course, easy and fatuous to sit back and pass judgment on situations which no amount of judgment can recreate; but each accident provides a lesson—a legacy to the climbing fraternity—which, if it be learned and applied, can avert the consequences which inevitably accrue to those who violate respect for the high places.

We stand today on the threshold of an era which promises wide participation in the joys and benefits of our sport. It is our responsibility to see to it that those joys and benefits continue to be mountaineering assets. To do so we must clean house—sweep away the dust of ignorance and the cobwebs of inexperience, polish our family heirlooms of tradition so that they may be seen and admired, not forgotten. This done, we can relegate to a closet the horseshoe of luck which has been over the front door too long, and invite one and all to enter and partake of the fare we have to offer. This fare is such that it should produce positive distaste for climbing beyond our margins of safety, climbing beyond our limits of time, climbing beyond our limits of endurance, attempting climbs beyond our experience, climbing for the sake of "peak-bagging," attempting first ascents for the sake of the record, relying excessively on artificial aids. We can find the proper ingredients for this antidotal fare only by going to the individuals who constitute the American climbing fraternity, and who, composed into groups, clubs and national organizations, can exert such an appeal to reason as will make our meal not only tempting, digestible and beneficial to those of us who love the mountains, but attractive and inspiring to those who will compose the climbing generations of the future.

What is mountaineering? To each of us, I think, the word has a slightly different connotation, acquired as a result of an individual philosophic attitude toward mountains. Whatever it is that draws us individually to the hills, we must all agree that a true mountaineer should possess one basic attribute: the ability to live and travel where he chooses among mountains, secure in the knowledge that, whatever the circumstances, personal and collective security will be assured. There is no truer maxim for a mountaineer than the old English jingle:

> He who climbs and comes away
> Will live to climb another day,
> But he who is in climbing slain
> Will never live to climb again.

If we accept the stated definition of a mountaineer, how can a lover of mountains aspire to the title? As I see it, in precisely the same manner as an individual who aspires to operate an aircraft.

Surely the air cadet, on receiving his wings, restricts his newly acquired talents to conditions falling within the scope of his experience. As his flying hours mount, air-wisdom grows; and the pilot absorbs, through instruction and experience, knowledge of a variety of subjects which permit wider exploration of his chosen medium. More powerful planes are mastered, instrument flying learned, practical meteorology appreciated. Concurrently, longer flights are undertaken; and eventually the pilot becomes qualified to operate his craft under all conditions. He has attained in his own field a status equal to that of a mountaineer in the mountains. Many pilots, with the confidence born of inexperience, exceed their margins of safety; and all too often we read of a crash attributed to "pilot error." In the mountaineering obituary, it would read "climber error."

There are two essential differences between our pilot and our mountaineer. The one is restricted in what he may fly and, to a certain degree, in where he may fly it; the other is free to climb whatever peak he wishes whenever the opportunity affords. Nor would the climbing fraternity have it otherwise. Yet the mountaineers of the country have a moral responsibility to exert every effort toward guiding the climbing cadets into the ranks of true mountaineers.

We in this country take pride in accomplishment; we have achieved superlatives in most fields of national endeavor; we thrive on competition—all admirable qualities, but not without peril when they are injected into the sport of mountaineering. Here, all too often, our enthusiasm runs away with us: after a few uneventful sallies onto practice pitches or ski slopes, we consider ourselves ready for anything. The consequences of such an attitude are obvious. They are set forth all too tragically on other pages of this *Journal.*

How much we miss by forcing the pace, even though for a time we survive while doing so. How few of the true delights of climbing are appreciated if our ascents are crowded with emergencies or our minds distracted by the greed for notoriety. How many of the finest peaks are passed over, never to be appreciated, if we skim the cream of mountain ascents in our first few seasons.

Let us who have climbed to know the mountains infuse what we have learned, lived and enjoyed into those who would follow our footsteps. Let us seek out those who would climb and counsel

them along the path of prudence and balanced judgment. And let us temper our tendencies to make rash decisions with a recollection of Edward Whymper's closing words:

"Climb if you will, but remember that courage and strength are naught without prudence, and that a momentary negligence may destroy the happiness of a lifetime. Do nothing in haste; look well to each step; and from the beginning think what may be the end."

The East Face of Monitor Peak

JACK FRALICK

INTEREST in an unclimbed mountain face is quite likely to receive its first stimulus from the brief but challenging statement of an authority writing about the peaks he knows best. Such a statement was that of Dr. H. L. McClintock, of the American Alpine Club and the Colorado Mountain Club, when he wrote, "For those who want to try a climb of the first order . . . there is the east face of Monitor Peak rising almost vertically for more than a thousand feet, but with cracks and chimneys which may afford the expert a route to the summit."[1]

In 1947, from August 5th to 16th, the Chicago Mountaineering Club held its second Annual Outing in the Needle Mountains of southwestern Colorado.[2] Our camp at 10,750 feet on Noname Creek was close to Monitor Peak; and, at 7.00 A.M. one morning, Joe Stettner, John Speck and the writer set out to investigate the mountain's east face. In the leader, Joe Stettner, we had the expert required by Dr. McClintock. Several years prior to meeting the Stettner brothers through the medium of our club, I had heard Walter Kiener remark, "I would go anywhere with the Stettners." This tribute to the unsurpassed Stettner skill very well expresses the esteem in which these brothers are held by their climbing friends. John Speck, an excellent and highly enthusiastic climber at all times, was in especially fine condition on this occasion, having spent three weeks of the preceding month in the Selkirks.

Numerous sheep trails led us first through the forests above camp, then through beautifully flowered meadows, and finally out into the broad talus slopes under the eastern base of Monitor. As we drew closer to the mountain, we stopped frequently to examine our objective. The East Face of Monitor Peak is unusually impressive and forbidding. Its principal feature is an immense rock wall contained between two very steep gullies. This great central face is fully 1200 feet high, remarkably smooth, and extremely steep. I believe that its average angle exceeds 85°. It appeared simply un-

[1] *Trail and Timberline*, No. 224 (June 1937), 68.

[2] See p. 107, below.

climbable to us, and we turned our attention to the gullies which mark its left- and right-hand margins. The right-hand gully is obscure in our photographs, but the left-hand gully is seen to cast a slight shadow. At about two-thirds of its height, the left-hand gully contains an ominous black overhang, above which the gully bends off to the left and eventually intersects the ridge at a point well below and to the south of the summit. Except for this particular overhang, the gully appeared to us to offer the possibility of a route; but from such a distance, of course, we could not fairly judge the defences of the overhang. We decided to attempt the left-hand gully.

Before starting the climb, we consolidated the contents of our rucksacks in two loads, and left the third sack behind. Our equipment was chosen for serious work. Among the items we carried were 120 feet of nylon climbing rope, 30 feet of 5/16-inch sling rope, twelve pitons, six carabiners, two piton hammers, and sneakers. There was interesting variety in our footgear. Speck wore Army Bramani boots. Stettner's boots were of his own design, consisting of a smooth rubber sole set with nine special hard steel nails, five along the outer edge of the sole and four along the inner edge. This combines the advantages of smooth rubber on dry rock and of nails on grass, mud, wet rock, etc. The writer wore conventional nailed boots throughout, and found that his Swiss edging nails provided an excellent grip on the granite. In fact, the rock throughout the Needle Mountains seems especially well suited to the use of nailed boots.

At 9.00 A.M. we started climbing in the left-hand gully. About 75 feet from the bottom, a small overhang was encountered. Since there were at least one or two more of these in the lower part of the gully, we decided upon a traverse to the left below the first one. Joe tied into the rope as leader, and moved out over steep, smooth rock. This distinctly difficult traverse, at the end of which Stettner placed our first piton, served as a worthy opening passage in the climb. Of greater importance, it put us in a position from which we were able to work up toward a junction with a very long chimney on our left. This chimney ran upward on a slight diagonal from left to right; and, at a height of at least 450 feet above the base, it intersected the major left-hand gully in which we had started. Our route entered the long chimney at about half its height. The remainder of the chimney was difficult throughout, and I have no clear recol-

lection of each successive step in the ascent. At least twice we were forced to leave it for a short stretch, always by a traverse to the right. One such traverse was unforgettable. At this point, the sides of the chimney converged and overhung to form a little cave in which the belayer could wedge himself. The traverse to the right of the cave, made possible only by the existence of certain slight irregularities in the surface of a steeply inclined slab, required a ticklish bit of climbing, as exposed as any likely to be found. The slab overhung the wall below, and the view straight down was uninterrupted for hundreds of feet. The end of the traverse was actually on the left-hand margin of the big gully. Here a rib was climbed for a short distance, and then another airy traverse led back into the chimney. Stettner placed a piton on this upper traverse.

The long chimney finally intersected the gully at a point below the major overhang, which we had viewed with some misgivings from the base. Above the intersection, the left wall of the gully formed a series of steep, smooth slabs leading up to the overhang. In this section, a number of pitons were placed for security. Much loose rock had been encountered thus far in our route. Rotten granite had constituted a real danger in several places, and the rock was not altogether sound in this zone of slabs. It was here that Speck and I once thought the climb about to end. Tiny fingerholds gave way under Speck's hands, and he fell. Since he was off to my right and below me, he swung and fell at the same time; and in stopping his fall I was unable to keep my stance. Instinctively, I checked and stopped his rope, too rapidly perhaps, and was pulled off and down to the next ledge about five feet below—doing a somersault en route. Our combined fall came heavily on Stettner, but he held us on the piton and carabiner through which he was anchoring me. John and I landed in such positions that we could quickly take our weight off the rope. Stettner's caution in anchoring me while I belayed Speck had reaped a handsome reward, for it was only his anchor that prevented this fall from being more than a bad moment. After the incident, we continued up the slabs to a little ledge on the left wall of the gully, directly under the major overhang.

We had now reached a point two-thirds of the way up the gully, and we were faced with what had seemed to us the crucial part of our projected route. Our original idea was to climb or circumvent the overhang, and finish the ascent by means of the gully.

We had entertained no thought of finishing the climb in the great central face. Closer examination necessitated a change of plans. The overhang rose directly above in the left wall of the gully. A slanting crack, starting beneath the overhang and running out to the right of it, gave access to a ledge from which farther progress in the gully would probably have been possible; but this crack was so rotten and wet that we looked elsewhere for the key to our problem. This was not to be found anywhere in the back of the gully, which consisted of an unassailable perpendicular rock wall, but over in the right wall a layback crack seemed to offer some hope. To reach this crack, Stettner moved to the end of our little ledge, placed a piton directly beneath the overhang, and arranged a doubled rope. By simply drawing a sufficient amount of slack through the carabiner, he provided himself with a doubled rope suspended from the piton. Grasping this, he quickly lowered himself about ten feet to the floor of the gully. Then a delicate traverse across a very smooth slab below the perpendicular back wall led to the bottom of the layback crack in the right wall. This slanted from right to left, and rose steeply about 30 feet before it ended in another 15 feet of steep rock leading to a good ledge. Stettner placed a couple of pitons and a rope sling, and then made two unsuccessful attempts to start the crack. These spoke eloquently of its great difficulty, but Joe's only comment was his request for a shoulder stand. Speck dropped down to the floor of the gully, crossed the slab nicely, anchored himself to a piton, and wedged into the bottom of the crack as securely as possible. Using the rope sling and John's shoulder as footholds, Joe managed to get started in the crack. With his hands gripping the right edge, and using his feet against the left edge, Joe Stettner did a layback up the 30-foot crack and climbed into the steep rocks above it before he could pause for even the briefest respite from his exhausting efforts. It was the hardest work thus far, and it pushed Stettner to the limit of his exceptional strength and ability.

The other two members of the party were obliged to accept some assistance from the rope in the lower part of the layback crack. An additional aid which the writer found necessary will be disclosed shortly. First, I had to cross the gully. After dropping down on the doubled rope, I attempted to cross the slab. For the first and only time during the climb, I felt that my boot nails were inadequate. Sneakers would have proved helpful at this point; but mine were

in one of the rucksacks, and these had been pulled up already. A slip here would have meant a drop and a long swing over against the right wall of the gully, since my companions were well above me and a considerable distance off to the right. But I saw that it was possible to climb a few feet farther down the left side of the gully, which would reduce the arc of any swing over to the right side. Here the crossing proved no easier, and in the end I simply swung across on the rope. The swing was about 15 feet across; and, owing to the elasticity of the nylon rope, I also dropped about ten feet. This was not an altogether pleasant experience, but it got me to the right side of the gully at a point from which it was possible to climb up to the layback crack. To negotiate the lower half of the crack, I required the assistance of a rope sling tied to the other end of the climbing rope. Thus, a brilliant piece of leading, augmented by the use of pitons, rope slings, a shoulder stand, and a swing on the rope, enabled our three-man party to stand together on the same ledge once again, now looking down upon, rather than up to, the major overhang.

Having overcome what we had thought would be our greatest difficulty, we were now committed to finishing the climb in the central face. The gully bent off to the left above the major overhang. It contained two more overhangs full of ice and mud, and would have been exceedingly difficult to reach from our position on the right side, since we were separated from everything to the left by the sheer back wall previously referred to. Therefore we turned to the central face, half of which still towered above us. We had not looked at our watches since starting, but the shadows deepened steadily as we worked up into the face; without speaking of it, all must have begun to realize the probability of a bivouac. The route, although strenuous, was somewhat easier for a time than it had been in the gully, and the rock was sounder than in the lower part of the climb. A succession of cracks and ledges led alternately upward and to the right toward the center of the face. In this section, the writer was guilty of a slip. Because he was well belayed from above, the slip was inconsequential; and the difficulty was overcome on the second try. Finally, the last man on the rope emerged from the top of a 50-foot chimney to find that Stettner had located a ledge, slightly below and to the left of us, which was quite spacious for Monitor Peak East Face. Here we bivouacked at 8.00 P.M. Although only about 300 feet of the face remained above us, the difficulties of

this section would have been prohibitive in the dark, as subsequent events proved. Furthermore, our bivouac ledge was the last one of adequate size found on our route. The leader displayed excellent judgment in deciding to stop there.

Our place of bivouac was a downward-sloping ledge about six feet long and four feet wide. Preparations for the night consisted first of donning all our spare clothes. Then the most objectionable stones were cleared away and placed in a small semicircle to mark the area within which we could safely sit. Two pitons were driven into the rock above the ledge; and, after tying into these, we arranged the coils of the rope and our sneakers in the form of a seat. We had something to eat, and then sat as close together as possible and covered ourselves with Stettner's raincoat. Although a raincoat is not normally expected to perform the function of a bivouac sheet, this raincoat did so quite remarkably; and to it I attribute the fact that we kept reasonably warm and dry during what otherwise might have proved a wet and chilly night. The coat was really inadequate for three, and I am afraid that Speck did not share quite equally in its use. He fared quite well, however, having both a windproof parka and a rain jacket. As long as we sat still underneath the coat, we remained comfortably warm. Only when we sought more comfortable positions, unfortunately quite often, did we remove the coat and feel the cold. It rained three times during the night, once to the accompaniment of much lightning; but we kept dry—thanks again principally to the raincoat. After the rule of all bivouacking, we really slept very little; and yet, probably because we were usually warm, the night did not seem unduly long. We suffered only from thirst. We had started with a reasonable expectation of finding some water in the face; but, except for the slimy crack beneath the big overhang, our route had encountered none. Fortunately Speck had a generous supply of hard candies, which proved very helpful; and in one of the sacks we found a grapefruit from which we extracted the very last drop of juice. Our food supply was more than adequate, especially since we experienced little hunger throughout the climb.

It was our intention to stay under the "bivouac sheet" until the sun had been up long enough to warm the face; but, as we watched the clouded dawn from our little perch, it was evident that we might have too long a wait. Furthermore, we were anxious to find

out what was ahead, as we were by no means certain that the rocks above were possible. Accordingly, at 6.45 A.M., Stettner and Speck changed to sneakers, and we started off. It seemed good to be under way again. Crossing above the top of the last chimney of the night before, we climbed up to a narrow ledge to the right of it. We were now squarely in the center of the face. This entire upper wall appears absolutely impossible from below, even in the eyes of experienced climbers. Joe Stettner was as deadly serious as I have ever seen him. He moved out to the end of the ledge, placed a piton, and climbed a very few feet above it. What he saw was not inviting, for he retreated to the ledge, looked far out to his right for another way, and even dropped down several feet to a ledge below ours. From this there was likewise no alternative, so Joe returned to our ledge and prepared for the toughest climbing in his long career. His lead from this point was the finest that I have ever known a man to accomplish. To start, he placed another piton above the first one, and tied a sling into it. Then the sling and a shoulder stand on Speck enabled him to establish himself on the nearly vertical wall at a point from which he made an extremely delicate traverse to the left above our heads. After this traverse, he was completely out of sight; Speck and I were aware of his progress only by watching his rope. For long moments we watched it hang motionless, and then with immense relief saw it begin to run out again. We knew our leader so well that the painfully slow movement of the rope told of very great difficulties above. John and I exchanged frequent glances of wonder and admiration, to which an element of concern was added as Joe gradually used up almost the entire length of the rope. In the upper part of this long lead, he really derived little or no effective protection from our belay or from the pitons he had placed along the way, because the amount of rope left to be run out in the event of a slip was inadequate to absorb the shock of a fall from so far above. His great height was evidenced by the speed of the stones which he sent down. At first we could watch them, but later they whirred by unseen.

Finally, after a very long time, and after taking out practically the entire 120 feet of rope in this single lead, Stettner found a place from which he could belay. Speck followed as far as the end of the traverse, where a piton enabled him to wait safely while Stettner changed his belay to a better ledge some 20 feet higher. Speck then

climbed up to Stettner's previous belay, and it became my turn to follow. The ledge occupied by Stettner was between 130 and 140 feet above me, and we have since designated the intervening pitch as the "140-foot lead." To maintain a rope connection between John Speck and himself, while John belayed me, Joe added to the length of our rope by tying the remaining sling rope to it. This was typical of the manner in which he took advantage of every opportunity to safeguard the party throughout the climb.

My wait on the uncomfortable little ledge had been a long one, and the early morning threat of bad weather had entirely disappeared by the time I was able to start up the "140-foot lead." At the end of the traverse, I found the piton at which John had waited. Everything beyond this point had been out of sight from the ledge below. The piton was located at the bottom of a V-shaped chimney, which could be climbed with the back against one side and the feet against the other for about 15 feet. Then, an overhang preventing further upward progress, it became necessary to change to a straddling position to gain the edge of the rib which forms the left side of the chimney. Stettner considers that the next move was the worst in the entire climb. Only after several tries was he able to reach and make use of a few minute roughnesses, barely within range of his outstretched hands, which made possible a short but terribly difficult traverse to the left. Above, the remainder of the pitch continued out on the very steep wall to the left of the chimney. When our party was finally united again, less than one and a half rope lengths separated us from the summit ridge.

These last rope lengths were distinctly easier than the preceding one, but the rock was looser than in any other part of the route. We climbed this final section with great care, realizing that now only an accident could alter the happy outcome of an issue which had exacted far greater efforts than we had anticipated 26 hours earlier. At 11.30 A.M., the last man was up, and the first ascent of the east face was completed. The final 300 feet of the route had required nearly five hours.

Our arrival on the summit ridge was the occasion for a chorus of yells and calls from the top of Peak 12. A group from camp had watched our progress throughout the morning from points near the base and on Peak 12. In fact, Orrin Bonney and Hal Johnson were at the base with binoculars by dawn, and by nine o'clock Johnson

had returned to camp to assure the others that our party was not in distress. Now a large group on Peak 12 shouted long and loud, and we were very happy that the moment had arrived for calling back to them with equal enthusiasm.

After building a little cairn on the ridge to mark the point where we had emerged from the face, we turned toward the summit, which was perhaps another 100 feet higher and a few hundred yards to the northwest. The broad, gentle gullies of the south face offered simple scrambling and promised an easy descent. On the summit (13,703 ft.), we rested and ate, and simply enjoyed being there. Just before descending, we entered our names in the register with the notation, "August 9-10, 1947 Via East Face."

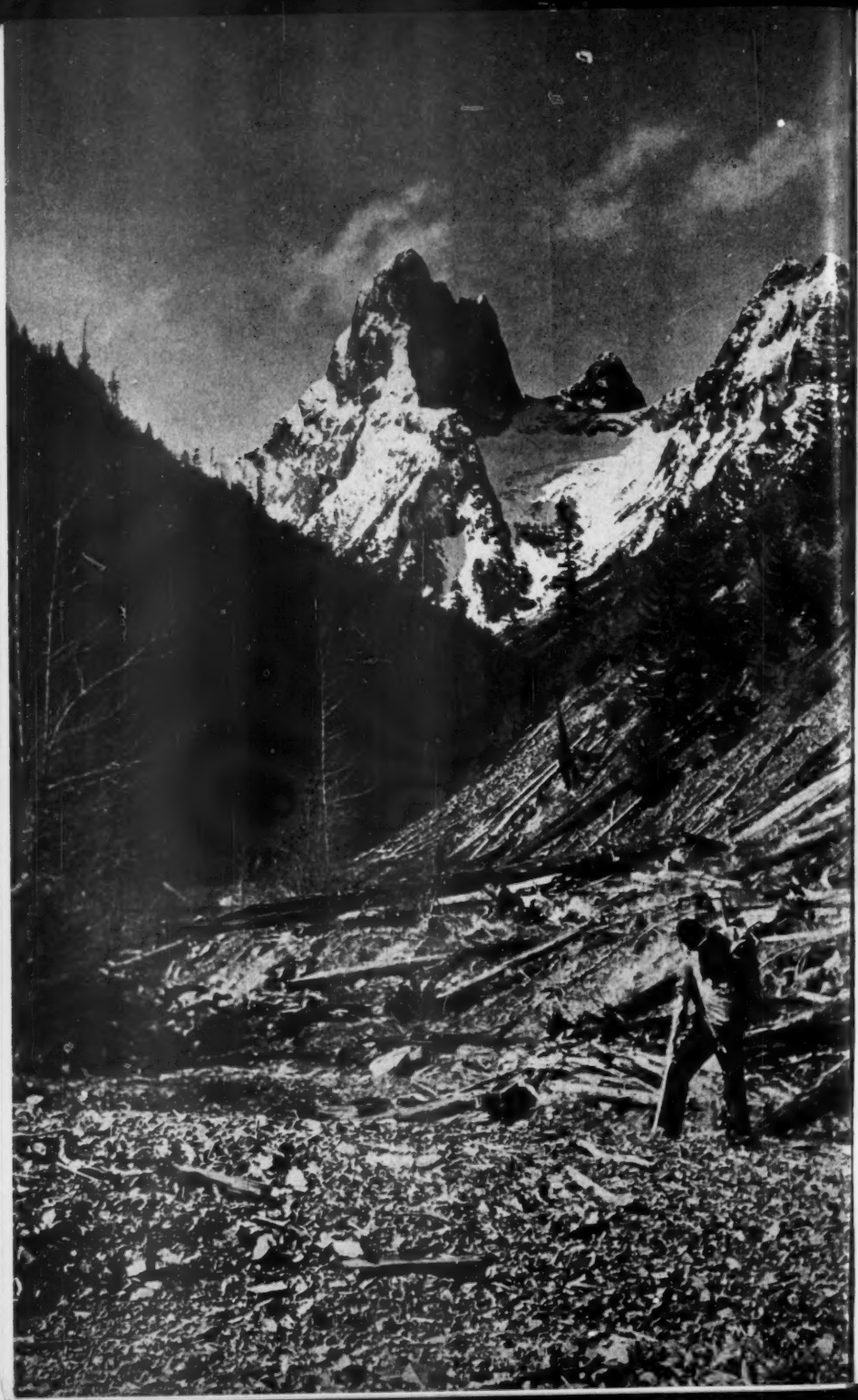
The descent was easily made in a southeasterly direction by the gentle gullies of the south face. Near the very bottom of the face we encountered the steep cliff band which apparently extends along the southern base of the entire Monitor-Animas massif. This band is of varying height, but it was only about 50 feet high where we struck it. We fixed a sling around a convenient chock stone, and concluded the Monitor climb by roping down the 50-foot wall to the talus slopes of Ruby Basin. A very short distance to the east of our landing place was the Monitor-Peak 12 col, from which we could look down upon the basin of Noname Creek and the familiar slopes leading back to camp.

The East Face of Monitor Peak is an extremely difficult climb. Joe Stettner considers that it is the most difficult he has ever accomplished—even more severe than either the Stettner Ledges route on the East Face of Longs Peak or the North Wall of the Grand Teton. The difficulties are continuous, and they increase as height is gained, building up to two passages of the utmost severity: the layback crack and the "140-foot lead." Furthermore, the rock is definitely unsound in the lower half of the route and again in the last rope length. We placed a total of 19 pitons, using 11 the first day, two in the bivouac, and six the second day. Those pitons which could be extracted were removed by the last man for further use. About nine pitons were left in the rock. Actual climbing time for the 1200-foot wall was just under 16 hours. A fast party making a very early start from the base might get through in one day. Our rucksacks had to be hauled up at nearly every step, and much of the rock was of such character that it had to be handled with the

greatest care. Only about half of our pitons went into the rock with the kind of ringing sound characteristic of a firmly placed piton.

It is hoped that, between the lines of this recital of cracks, chimneys, ledges and overhangs, something of the writer's admiration for his leader has emerged. Joe Stettner's inspiring leadership was nothing short of magnificent. To have been a companion to such a man on his greatest climb was a privilege which will occupy a niche in the mountaineering memories of the writer as commanding as our bivouac ledge high on the East Face of Monitor Peak.

EAST FACE OF MONITOR PEAK, NEEDLE MOUNTAINS
The site of the bivouac is marked +
Photo, H. Lumby



Hozomeen at Last

FRED BECKEY

STORM clouds were thickening. Herb Staley, Mel Marcus and I pushed rapidly up a steep rock buttress, apparently the only approach to the South Peak of Mount Hozomeen. When we reached the tip of the buttress, we could catch only glimpses of the gaunt summit tower amid swirling mists. What we saw looked incredibly steep; worse yet, a connecting ridge of startling pinnacles blocked the way. Before we could have another good look at the final problem, a drenching cloud engulfed both us and the summit, and forced us to descend to Willow Lake, 4800 feet below. Our return was anything but pleasant. We had made a 27-mile hike from Ross Dam, only to be foiled in our climb by the stormy weather of June 1946. Perhaps we should have taken the advice of the trainman who warned us, "You'll never make it!" The previous fall, Wayne Swift and I had tried to reach the sheer peak from Allison Pass in British Columbia, only to be thwarted by poor roads, a misleading trail and eventually a rainstorm. But these defeats served only to stimulate us.

Years before, I had often seen Hozomeen from the western Skagit region. It is a large mass of greenstone rising abruptly from the alluvial Skagit Valley, a mile and a half south of the Canadian border. The North Peak (8080 ft.) is quite sheer, but has an easy ridge, found by an early survey party. The more precipitous and complicated South Peak (8020 ft.), one mile distant, has been described as "inaccessible" in a geological report; but to a climber this peak is a challenge. In 1944 a Canadian party coming from upper Lightning Creek made a reconnaissance, but attempted no climbing because of fresh snow.* Hozomeen rises over 6000 feet from the Skagit River on the west and from Lightning Creek, a Skagit tributary, on the east. Willow and Hozomeen Lakes lie at 2800 feet among wooded knolls at the base of the South Peak. The imminent flooding of the Skagit Valley by the Ross Lake reservoir will soon make the peak "rise out of the water."

* W. H. Mathews, "Mount Hozomeen," *C.A.J.*, XXIX (1944-45), 160-61.

SOUTH TOWER OF HOZOMEEN FROM LIGHTNING CREEK
The route was along the sky line to the right
Courtesy of Canadian Alpine Journal *Photo, W. H. Mathews*

In 1947 the challenge beckoned again. Interest among other climbers proved to be acute. I restricted the party to six, and on Memorial Day weekend we set forth—Charles Welsh, Herb Staley, C. Molenaar, Duke Watson, Jack Schwabland and I. The problem of approach was greatly eased by a new road from Hope, British Columbia, to the northern shore of Ross Lake. We had a walk of only three miles to Hozomeen Lake. From the lake we had only a cursory view, for clouds hid the great upper cliffs of both peaks. The morning of May 31st promised little. We took to a raft and crossed the lake; but our old nemesis, the rain, set in and kept us beside our fires or on scouting climbs during most of the day. The next day did not dawn at all, so we returned to civilization.

The weather and Hozomeen could not hold us off for long. On June 14th Staley, Welsh, Marcus, Jerry O'Neil, Ken Prestrud and I drove up the Silver-Skagit logging road again. By flashlight we climbed over Jackass Pass and on to the lake. At 6.00 A.M., in fair weather, we struck out for the South Peak. A long rock gully took us past the tremendous cliffs above the lake. Once a volley of rock from the vertical cliffs clattered into the gully beneath us. At 5000 feet the gully was filled with snow. Soon we were on steep snow; and then, after a short rock climb and traverse, we finished the exposed ascent from the west at a saddle (6500 ft.). The morning ended with the entire party changing to sneakers, eating lunch and preparing for the final assault. We could look down at the long route taken from Willow Lake the year before. The sun shone brightly on the mighty Skagit peaks, but beyond them a dark layer of stratus was coming our way.

Our plan was to continue upward from the high tip of the buttress reached on the earlier attempt. At first, as before, a very steep and exposed 200-foot rock face proved difficult. Then we climbed simultaneously to the tip (7500 ft.). Looking northward, we peered at the incredibly steep peak with sinking hearts. Seldom have I seen a face so hopeless-looking. Even the knowledge that a face is distorted when it is seen head on did not encourage us, for here we had previously seen overhangs in profile. Moreover, the rock looked rotten, and the connecting ridge of pinnacles appeared to be impassable. Southeast of the summit, we observed, there lies an extended promontory from which one could stroll to the top; but the approach to this promontory, we thought, would be very difficult indeed. In the hope that a closer inspection might help, we

decided to attack the pinnacled ridge--Marcus, Prestrud and I on one rope, and Staley, O'Neil and Welsh on the other.

After descending over 100 feet on the north side of the buttress, we concluded that the overhanging wall of the first pinnacle was impossible; but here we spied a possible route around the pinnacles' east face. A downward traverse led to a patch of snow. Thence we moved, by way of a "chinning pitch" that required some muscular effort, to a ledge around the corner. We were surprised to find that a very possible series of ledges extended beneath the pinnacles, on the east side, to the notch between the last pinnacle and the summit face. We climbed along these ledges quickly and with more enthusiasm, but very carefully, for the exposure was great. At the notch we glanced over the west edge, above a branch of Lightning Creek, and dropped a rock. It did not hit for 2000 feet.

Looking up, we could see only a very steep arête. The rotten face to its right was composed of a series of short overhangs and high-angle slabs, but it might be climbable. The face of the promontory, farther to the right, seemed to be uncompromisingly hostile: even to reach it would mean a most difficult and dangerous traverse. Marcus, Prestrud and I slowly worked our way up a series of ledges and tiny cracks on the east side of the narrow arête; Welsh followed, leading the second rope. We were taking great care with our belays, because of the exposure and the unsoundness of the rock. Soon an overhang of white rock blocked our route back up to the arête, and nothing useful appeared to the east. On the right side of the overhang, however, I found a vertical pitch that was feasible, and then moved across a treacherous slab to the arête again. As soon as the others were up, we continued the pattern, climbing diagonally upward on the east side of the arête. The arête itself had too many overhangs and too sheer a drop on the west side for us to want to use it.

Now we were halted by another overhang, extending completely across the face. When Prestrud had anchored himself securely on a convenient ledge, Marcus and I took turns at pounding in several pitons and giving the pitch a try. The rotten holds were of little use, however, and on the upper part of the overhang there simply were none. We tried several variations and attempted to fix a high aid piton, but returned to the ledge each time without success. The problem was annoying, and it was consuming valuable time.

Finally we tried a complicated maneuver. I anchored myself to a fairly sound piton and clung to tiny holds to the left of it. I was held by tension from Prestrud's belay, some eight feet below. Marcus then threaded his rope to Prestrud, using a carabiner through a "moral support" piton two feet above my shoulders. The piton tension and single side-cling hold enabled me to hold his weight, even though my footholds were insecure. Having failed to find a piton crack, Marcus balanced himself on my head and then my right hand. With the added height, he somehow discovered a hand-hold and wriggled over the difficult stretch to a sloping ledge. Here he fixed a rappel rope, to speed the rest of us. Above ran a slanting crack. Belaying continually, we ascended this and a more difficult "chinning pitch." One more rope length of precarious climbing on the arête brought us to the end of our problems.

At 3.30 P.M. we stood on the spacious summit and viewed the rugged scenery of the Northern Cascades: Mount Goode and the Cascade Pass peaks to the south, standing out sharply; to the south-west, the amazing Picket Range, crowned with snowy ridges; to the west, Twin Spires and the Chilliwack Peaks, towering beyond the Skagit Valley. The regions to the north and east were drier and less interesting to the climber. We could hear lumbering operations in the valley, and we tried to imagine how different the view will be when the reservoir has filled the valley. One glance down the northern faces convinced us that a direct ascent of our peak from Lightning Creek would probably be attempted in vain. Although skies were still blue above the Fraser Valley, the alto-stratus had already passed us from the south. Mount Baker and Glacier Peak wore cloud caps.

A little snow began to fall as we descended the steep upper pitches, mostly by rappels. Spurred by this new danger, we crossed the airy ledges beneath the ridge of pinnacles and climbed carefully up the now wet rock of the buttress tip. A fierce and biting wind made rappelling off the 200-foot lower face (S.E.) of the buttress very miserable. We scrambled to the saddle, climbed carefully down the rocks, and glissaded down the gully. Preferring rest to a descent by night, we traversed to a patch of timber at about 4800 feet. Huddled around a fire, snoozing under the trees, we had a long, damp night. Early on June 16th we descended wet, brushy cliffs to the lake, where we slept for a few hours. Then we left for the car, happy that we had climbed the South Peak at last.

Lloyd George Mountains: First Ascents

Henry S. Hall, Jr.

ABOUT 1920 I read in P. L. Haworth's book *On the Headwaters of Peace River* about the mountains located in 57° to 58° N., 124° to 125° W., and named by Haworth for David Lloyd George. At first these peaks seemed too remote to warrant serious consideration by the ordinary climber, but the vision of something alluring remained. In 1937, and again in 1946, after hearing that the peaks and snowfields had been seen from the air and from the Alaska Highway, I made halfhearted attempts to interest such men as Gibson, Hind and Hendricks in going there. Some additional information about the Lloyd George region was now available in print, for in 1938 J. Monroe Thorington had published an article incorporating observations from the air by Donald ("Curley") Phillips and flight photographs by S. L. Diack.* Such was the situation in the winter of 1946-47 when Rex Gibson, knowing that I had been vaguely attracted for many years, wrote me that Frank S. Smythe and Noel E. Odell were seriously interested: would I care to join them and him? I would, and needed no persuading.

During the next few months, Gibson busied himself with all manner of correspondence and arrangements. Toward the end of June 1947, the party, which now also included Mrs. Smythe, John H. Ross, of Cambridge, and David Wessel, of Bozeman, Montana, gathered at Jasper, did a little preliminary climbing, and divided into two groups for the roundabout journey to the Lloyd George Mountains by two different routes. Gibson, Ross and Wessel went by car from Edmonton over the provincial roads to Dawson Creek, and thence by the new Alaska Highway to Fort Nelson. Frank and Nona Smythe, Noel Odell and I took train from Jasper and, after a 24-hour delay caused by a freight wreck west of McBride, reached Vanderhoof on the Canadian National's Prince Rupert line early in the morning of July 2nd. A two-hour drive brought us to the old Indian settlement and Hudson's Bay Company post at Fort St. James, at the east end of 40-mile-long Stuart Lake. Here Central B.C. Airways, with whom Gibson had been in correspondence for

* "The Lloyd George Mountains," *A.A.J.*, III (1938), 142-7.

months, were supposed to be ready to fly us right in. Because of a change in management and the loss of files, they were not expecting us. We were rightfully wroth, but by noon the new management had made a rapid recovery and promised us the next plane in.

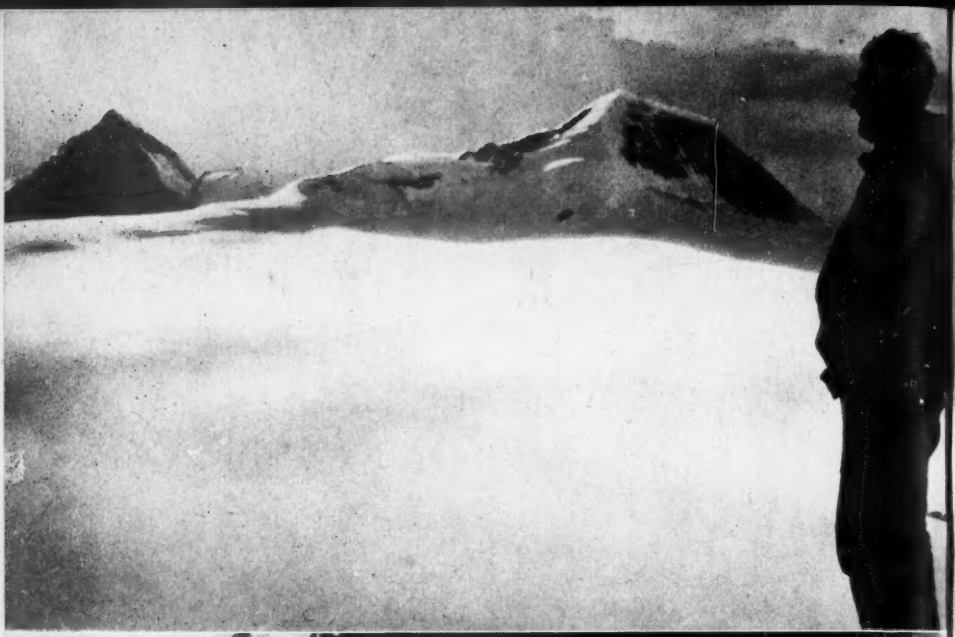
By 1.40 P.M. on the same day, we took off from Stuart Lake (2225 ft.) with Pat Carey, a capable bush pilot, in a little Junkers plane powered by a single Pratt and Whitney engine. Swinging north, we gradually climbed to just over 8000 feet, crossed Omenica River at 2.40, passed ten miles east of Tulizzi Lake at 3.00, crossed Ingenika River at 3.15, were over Pelly Lake at 3.23, passed a few miles southeast of Quadacha-Finlay junction at 3.53, and landed on Haworth Lake at 4.05. Looking up Akie River from the air, we had had broken glimpses through gathering clouds of the extensive snowfields around Redfern Lake. Quentin, Haworth and Chesterfield Lakes, with the Lloyd George snowfields behind, came into view as we swung up the Quadacha. At 4.30 the plane left for Fort Nelson to pick up Gibson, Ross and Wessel. It returned with them the next morning.

After some discussion of possible campsites—gravel flats or moss-covered ground in a stand of fir, with a clear spring—we wisely chose the latter and soon had established ourselves in comfort. Almost at once the weather started to deteriorate, and it remained poor until July 15th. After five fairly good days, it went sour again and did not make another serious attempt to clear before we left on July 30th. Some precipitation, often heavy, occurred on 19 of 28 days. The vivid green of the grass above treeline, the wholly unburned timber, the rich flora, the extensive icefields (about eight by four miles, at an average elevation of only 8000 feet) all testified to the probability that this is one of the wetter sections of the Canadian Rockies.

In 1934 the Bedaux Expedition, which passed by Chesterfield Lake only ten miles south of Haworth Lake, estimated the altitude of the latter as 4300 feet. We made Haworth Lake about 3800 feet, by an average of six aneroids from Stuart Lake and Fort Nelson. It is a very beautiful spot. I recall that a great sense of peace and contentment settled over the whole party when we learned on the day after the plane left that our radio transmitter was not powerful enough to reach outside stations. Our receiver brought us the world news, the baseball scores, the silly "flying saucer" stories and much

MOUNT DAVID LLOYD GEORGE, CENTRAL PEAK
WEST AND CENTRAL PEAKS

Photos, J. H. Ross



WEST PEAK FROM CENTRAL PEAK
THE PARTY AT HAWORTH LAKE
Left to right: Ross, Wessel, Gibson, Smythe, Mrs. Smythe, Hall, Odell
Photos, J. H. Ross

else for a few evenings; but soon even these reports were not of much interest to us.

On July 5th the plane came back from Stuart Lake with some remaining equipment; and Odell, Smythe and I made a two-hour reconnaissance flight to the north, to attempt (among other things) to find Mounts Roosevelt, Churchill and Stalin, to see the lay of the sketchily mapped land, and to ascertain whether we should plan to spend part of our month elsewhere. We flew north about 50 miles to the headwaters of Racing River, and circled a sharp rock peak (about 9600 ft. by aneroid) which might have been Mount Roosevelt. Turning southeast, we dodged fleecy clouds near a peak (not over 10,000 ft.) which might have been Mount Churchill, passed just west of Tuchodi Lake, and then gave up flying to Redfern Lake because of a gathering storm. We barely had time to circle the Lloyd George peaks, which we measured as close to 10,000 feet, and land on Haworth Lake before a fierce storm from the south lashed the surface into whitecaps. There was half an hour of torrential rain. During the two-hour flight, one thing impressed us most: the Lloyd George icefield and peaks stood out above all else within 100 miles. Nothing else was nearly so impressive from the air. We had flown at an average altitude of 10,000 feet, ducking to 8400 near Tuchodi Lake to keep below the clouds and rising again to 10,000 to circle over and around the Lloyd George summits. On this day, too, Gibson, Ross and Wessel became the first to reach the main icefield. They were directly below us when we circled the peaks, but we were so intent on the summits and the aneroids that we failed to see them. Later we learned that they were unable to find a good route for the descent, had a nasty time getting down, and reached camp late in the evening.

For the next ten days it stormed or threatened to storm daily and hourly. Smythe began his flower-collecting, and Odell his geological observations; Gibson and Wessel did what they could with their triangulation stations. Ross would go with one or the other, oftenest with Smythe because of his interest in flowers and photography. A raft was built for possible travel on the lake.

On July 15th, at 5.20 A.M., we set out for the West Peak of the Lloyd George group: Odell, Smythe and Wessel; and Gibson, Ross and I. The two parties were to travel by different routes. We kept together into Hidden Valley until we were just below the snout of

Stagnant Glacier. This glacier actually has small trees growing on its moraine-covered surface—most unusual anywhere south of Alaska, at least in my observation. Our rope reached the main ridge north of Hidden Valley by a steep 2500-foot couloir. From there to the summit, it was a struggle in soft snow, varying in slope up to 30°. We found no sign of the others. At 2.15 P.M. we stood in cloud on the corniced summit ridge and took turns looking over the sheer east face toward the Central Peak, which appeared, through momentary rifts in the clouds, to be exactly the same height as our own. My aneroid showed 9,750 feet—a disappointment. The descent in still softer snow was tiring, but an inner trough down the long snow couloir speeded things a bit. On the gravel flats below, we found footmarks pointing downward—to our relief, since we had begun to be concerned for the others. They had come, it seemed, to a snow slope of doubtful equilibrium on one of the humps in the ridge and, rather disgusted, had turned back.

Two days later, on July 17th, all six did the main summit on the best day of the four weeks. Some crampon work up the main ice tongue, a 125-foot pitch of steep, firm rock to pass quite close under the main ice cliff at the north side of the ice; and we were on the upper glacier. Circumventing a few crevasses, we came to the gently undulating main névé field. Then, after a Columbia Snowfield type of slog for three hours, a climb for an hour and a half up an easy snow arête of the final snow pyramid, and a 15-foot vertical snow pitch, we all stood on the small summit at 3.15 P.M., ten hours from camp. The altitude appeared to be 9800 feet, with a barely perceptible angle of depression to the West Peak. The view was extensive in every direction. A maze of peaks surrounded us. Stalin, black, chunky and sullen, just east of north, like Churchill and Roosevelt, if positively identified, was not outstanding. A prominent pyramid to the southeast might have been near Redfern Lake. To the southwest and west, perhaps well over 100 miles away, rose peaks of interior British Columbia and even of the Coast Range. This view, if somewhat average, was still inspiring; for remoteness does stir the imagination. None had ever seen this country from so high except in passing by air. The East Peak, two miles away, we estimated at 9400 feet. The only incident of the descent was in the passage of the 125-foot rock pitch. To save time and to keep the last man from being too exposed, we climbed one at a time down

to the ice surface under the overhanging ice cliff and, again one at a time, "ran for it" through a mass of small ice blocks, which now and then were dropping from above with sharp reports. No one was hit. Another half hour of crampon work brought us to the gentler ice tongue below, then easily back to camp and Nona's cheery welcome to supper.

On July 20th Smythe and Odell started for Cloudmaker, the attractive peak on the south shore of Haworth Lake; but they returned when Odell's sprained ankle gave trouble. Smythe and I then joined Gibson, Ross and Wessel on "Hill 6900," north of camp, where those three had spent the night in good weather for survey purposes.

On the 22nd Gibson and Ross occupied "Station 7900," south of the valley, and Smythe and Wessel left camp early by raft for Cloudmaker. On the way they were charged by a large bear—either a grizzly or an Alaska brown—which leapt out of the bush into the lake and tried to board the raft. Splashes and shouts diverted it in the direction of the shore, 25 feet away. Smythe and Wessel then continued, and eventually climbed the peak, but only after descending 1500 feet to avoid a heavy storm and then reclimbing to the top (about 8100 ft.). They slept that night at treeline and returned to camp by the now somewhat waterlogged raft.

On the 24th Gibson, Ross and I left with packs for the icefield and the East Peak. After occupying a camera station on a rock eminence (8500 ft.) four miles east across the névé, we spent an uncomfortable night and climbed East Peak the next morning, confirming the height as about 9400 feet. On the return across the icefield, I unroped and walked alone for two hours by a more direct line, while Gibson and Ross picked up the packs. The worst place on the route after I had rejoined them was a really steep, hard dirt slope at about 5000 feet. It hardly warranted roping, but for a distance of 100 yards it was distinctly ticklish for climbers with packs.

On the 24th Odell, Smythe and Wessel climbed Mount Crosby at the south end of the icefields, and reported the "bulge" glacier to the southeast of the icefields as the source of the Quadacha River, the "white water" reported by Haworth in 1916. Bedaux Pass separates the Quadacha from the eastward-flowing Muskwa, which rises from the most easterly glacier, the largest tongue to drain the 30-to-40-square-mile Lloyd George icefields. Another small northward-

flowing tongue from the head of the easterly glacier eventually drains into Quentin Lake. Quentin and Haworth outlets—the latter by way of a 200-foot fall, which accounts for the absence of fish from Haworth Lake—form the Warneford, which joins the Quadacha 20 miles above the Finlay.

On the 26th Smythe, Odell and Wessel sought revenge on the West Peak, and got it in good style by traversing from the Central Peak by a double-corniced ridge to the east face of the West Peak and then climbing up. From camp at sunset we could see the party cautiously making its way down the now bare upper ice slopes. Near midnight they came in. "Really got our teeth into it today," said Frank, as we enjoyed cocoa by the campfire.

Three days of bad weather followed. Just as I was starting to pack up on the morning of July 30th, the plane circled at the head of the valley and landed on the lake. Gibson, Ross and I climbed in. On the way out to Fort Nelson, we again tried to reach Redfern Lake, but were prevented by clouds. As we followed the Muskwa eastward, we soon saw the thin line of the Alaska Highway; and, after 90 minutes in the air, we landed on Fort Nelson River. Carey brought the others out to Stuart Lake the same afternoon. At the field we were told that General Eisenhower had passed through the day before and Viscount Alexander the day before that. We hoped that their visits to British Columbia had been as successful as ours.

First Ascents in the Coast Range of British Columbia

William L. Putnam

IN ORDER to meet a great demand in the Harvard Mountaineering Club for a summer expedition, I announced in March 1947 that I would lead a trip to the Coast Range of British Columbia. The demand proved even greater than I had anticipated; and, being convinced that I could not handle a large number of relative novices without assistance, I persuaded Fred Beckey, of Seattle, to come along. A committee composed of Frank Magoun and Larry Miner planned and purchased the food. Charlie Shiverick made arrangements with various persons in British Columbia to have guides with horses ready to take us down the Homathko Valley upon our arrival at Tatlayoko Lake. Other members of the expedition who performed various tasks in preparation were Harry King, Graham Matthews, David Michael (alias "Georgia"), Leonard Winchester and—most important—my big malemute, Skagway.

On 21 June 1947 Beckey, Miner and I, the advance guard, finished crating our food and gear at Williams Lake. Alastair Mackenzie's kindness in putting all the facilities of his store at our disposal greatly aided us, and the next morning we loaded some 1400 pounds of assorted food and gear into a plane that we had chartered from the Cascade Air Service of Chilliwack. Our pilot, Ronald Wells, did very well by us: we were able to drop our bundles at the head of the Tellot Glacier, just south of Mount McCormick, at an elevation of about 10,000 feet. Such an aerial drop, a trick we had used to good effect the summer before on Mount St. Elias, is well worth using on a trip of any size.

That night we arrived at Tatla Lake and enjoyed the meagre hospitality grudgingly offered at Alec Graham's ranch. In the morning, having taken our gear from my tired Plymouth and loaded it on our horses, we sallied forth down the Homathko Valley and pitched our first camp at the lower end of Bluff Lake. The next day, without incident, we proceeded farther down the valley and pitched our second camp about three miles below Middle

Lake. The third day we ran into trouble: Twist Lake was easily forded, but below it we came upon the Dead Lake and its network of fallen trees. After struggling through Dead Lake, we looked below it and saw the fresh rockslide that had dammed the river and pressed it hard against the west bank, where we were, making it impossible to cross. We had to find a way along the edge. As a great talus slope offered the only route, all five of us (including Batice Dester and Dave Wilson, our guide and packer) pitched into this quarter-mile of rock. At the end of the day on June 26th, Batice announced that horses could cross. They did. Accordingly we pitched our fourth camp, known as Wet Camp, about a mile beyond this talus slope in the dense timber.

All hands spent the next day in clearing the trail below Wet Camp. Batice and Beckey crossed the Homathko on horses at the braided ford, while the rest of us worked on the windfalls between camp and Crazy Creek. On June 28th we loaded up again, crossed both Crazy Creek and the main river, and proceeded down through the lowlands on the east bank to a large grove of cedar, where we camped. The next day we moved on to the spot where previous parties had built rafts to recross the main river to the west side. At two o'clock that afternoon we crossed with all our gear and horses, and started up the valley of Goat Creek. That evening we reached Halfway Camp, near which, at about three o'clock the next day, we were joined by the rest of the party. Crossing Goat Creek and then Cataract Creek, we situated Base Camp in a grove of trees near the junction of these two streams, a place that had evidently been used by an earlier party, probably McNeil and McCown.

Next morning, Beckey and Miner started early on a long jaunt toward Frontier Mountain (10,000 ft.); and, after making arrangements to meet us here with the rest of the expedition on July 9th, Batice and Dave Wilson took off down the valley, leaving Skag and me alone at Base Camp. With packboard and gun we started up Cataract Valley to see what we could see. An hour's slow walk put us on the lower part of the Cataract Glacier, where Skag felt quite at home after the long trip across the hot, dry continent. Suddenly I heard the sound of falling rocks and skidding feet. There, some three hundred yards above us, I saw a grizzly bear chasing a mountain goat over the rocks. The bear didn't stand a chance of catching

the goat, but still it seemed to me that the goat looked relieved when I dropped the bear. His joy was short-lived, however, because my second shot brought him down. That night, with a heavily loaded packboard, I stumbled into camp to find that the others had not yet returned. As I vaguely remember, about three in the morning Beckey and Miner, two very tired, wet and unhappy people, appeared out of the night. I learned later that they had been turned back from the summit of Frontier Mountain by darkness, and that they had had a few dunkings in Goat Creek on the night trip home.

The next day I cleaned the bear hide and then set up a "bear-pole" on which to hang our gear when we left camp. We planned to leave Base Camp about 6.00 P.M., hit the snow when it was frozen, and go up along the Cataract Glacier to the col between Heartstone Peak and Mount Shand, thence along the south side of Shand to the drop area near Mount Tellot. We set out. At sunset, near the junction of the East Cataract and main Cataract Glaciers, Skag fell into a crevasse. Thereupon we hauled him out and tied him on the rope also. With our malemute guide leading us through the crevassed slopes, we climbed slowly toward the col, and shortly before midnight felt the cold south wind blowing off the Tellot névé. Later, with Beckey doing a masterful job of finding the route, we reached a point a few yards short of Mount Tellot and camped.

A mountain tent I consider to be a useless article under any circumstances, but the three of us crawled in and made ourselves as comfortable as possible. We were almost asleep when Skag (the sissy!) decided that it was nicer inside than out. We were so tired, however, that Skag, stretched out across us, made no difference. Skag worked in very well on this trip. He consumed no special amounts of food and cleaned our pots very well, so that he was at times a welcome addition. He fell in only one crevasse and thereafter could spot covered crevasses even better than I.

The hiss of snow blowing against the tent woke us in the morning. Right away I knew we had to work fast in order to locate the loads dropped from the air before they were covered. In short order we were out of our sacks and up on the high ground to the south, where our gear had been dropped. Searching through the cold, blowing snow, we located bundle after bundle, and stacked them in piles of two or three. A few we took with us to our selected camp-

site on the leeward side of this area, where by mid-afternoon we had two tents set up together on a platform and well-stocked with food. Beckey and Miner were together, while Skag and I did the cooking in the other tent. At five o'clock on the afternoon of July 3rd, we had our first meal of the day. Despite my cooking, it was delicious.

On Thursday and Friday we were pinned down. I have been in worse storms before in the mountains, but have never been so unhappy about things in general. On Saturday, frustrated by the storm, which had already piled up two feet of snow, we decided to evacuate the high area. We tied up our tents and set out in the direction which we hoped would lead us along our route. All went well. We broke out of the clouds near the junction of the Cataract Glaciers and had sunshine for our last two hours of descent.

Sunday, Monday and Tuesday were spent in making an emporium of our Base Camp. On Wednesday, July 9th, the bad weather still continuing up above, Beckey and I, rock climbing near Base Camp, spied the main group coming up the valley. Calling to Larry, who was down below, we prepared to receive them. Upon their arrival, we learned that everything had gone according to plan; all the remaining gear had been brought in, and much food as well.

On Friday we bade farewell to Batice and the packers, after agreeing to meet them on August 10th at the raft crossing of the Homathko. With them went Larry Miner, who was forced to go out because of illness. As the weather continued bad for several days more, we were restricted to local operations. Four of the troops made valiant attempts to scale the huge monolith near the snout of the Scimitar Glacier, but each time they returned unsuccessful, with grandiose plans for the next time.

Finally, on the bright, clear morning of July 16th, we began to move out. Sending Beckey in charge of all the others, I stayed behind with Charlie Shiverick to make Base Camp bearproof. The main party was to go up to the High Camp and set it up, then start climbing from that point. Meanwhile, Shiverick and I planned to go up the Isolation Glacier to the divide along its northern edge, and pitch a camp there.

All our plans went well. As we reached the top of the moraine on the south side of Isolation Glacier, the other party was just reaching the top of the col. Descending from the moraine, Shiverick and I crossed Isolation Glacier and climbed along its northern edge to the divide. The next day, July 17th, we set out for the prominent isolated peak which Beckey and I had both observed from different vantage points. We had noted that it was situated to the north of the Cataract Group and that it appeared to dominate the region for some distance around. Our route was around the peak to the north and then up the glacier to the northeast ridge, which offered no serious obstacles other than moderately difficult snow-covered rocks. At two o'clock we were on the north summit, and shortly thereafter we had climbed the higher south summit. The view from here was excellent and afforded me a first-class opportunity to work on my map. We spent the better part of an hour on the summit, and after constructing one colossal cairn we started down. After throwing rocks to make one saturated slope avalanche, we descended easily.

The next day we loaded up our gear and started across the divide between Isolation Glacier and Malemute Glacier.* We traversed the western edge of the latter, and then started up beneath the sheer east wall of Mount Schultz. When Shiverick, Skag and I reached the top of the col between Mounts Schultz and Despair, we looked for a campsite. Tired of sleeping in a mountain tent, we commenced the construction of a snow house. That night we cooked and ate in splendor. Above our heads was the most weatherproof dwelling we had been in since leaving Williams Lake.

The morning of July 19th was not encouraging; but, with the sun shining brightly between clouds, we roped together and started up the long snow slope on the south side of Mount Schultz. The slope became very steep near its top, and then left us facing a 20-foot drop-off. Skag had followed closely up to now, but here he sat down and waited impatiently for our return. As the summit was not difficult to reach, we climbed onto the ridge and very soon were building our usual summit cairn.

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* Geographical place names used in this article are not necessarily official.—*Ed.*

This was the day we were to be at the High Camp. Since I planned to return later and climb the other near-by peaks, we left much of our gear in the house, and started for the upper Tellot Glacier. At five o'clock, when we were very close to High Camp, Beckey came down and told us the sad news. The storm from which we had retreated had covered every trace of our previous camp; probing had been of no avail. However, all was not lost. Bundles which we had stacked near the top of the rise had not been covered, and so there was a livable camp set up. Stoves were lacking, but otherwise life at High Camp was fine.

We also learned some good news. During the three days Shiverick and I had been gone, the High Camp crew had made the first ascents of several peaks. Mount Shand had been a fairly easy climb up the southwest ridge. Mount Tellot's west peak also had been easy, up the southeast ridge; but the east peak had been tough. Mount McCormick had been slightly difficult, but ascents had been made of both the peak and the needle. Mount Dentiform, by way of the north face and some dangerous slabs at the summit, had proved a hard climb. An attempt had been made on the first Claw Peak, but lack of sufficient ironware had sent the party home unsuccessful.

Taking stock of the situation at High Camp that night, we decided to split the expedition into two groups. The question was put to the assembled multitude: to stay with Beckey, or to go down to Camp Sunrise with me. I did not want to climb among the higher peaks because I did not want to run into a repetition of what had happened to me on St. Elias the summer before, but Beckey was most anxious to try them. The final arrangement was that Shiverick, King and Winchester should stay at High Camp with Beckey, and that Magoun, Matthews and Michael should go back to Camp Sunrise (9200 ft.) with me. It was agreed that the whole party would be reunited at Base Camp on the 24th, at the latest.

The next morning the four of us, with Skag setting the pace, started back to Camp Sunrise and the stove. At eleven o'clock we deposited our loads on the knob where Shiverick and I had lunched

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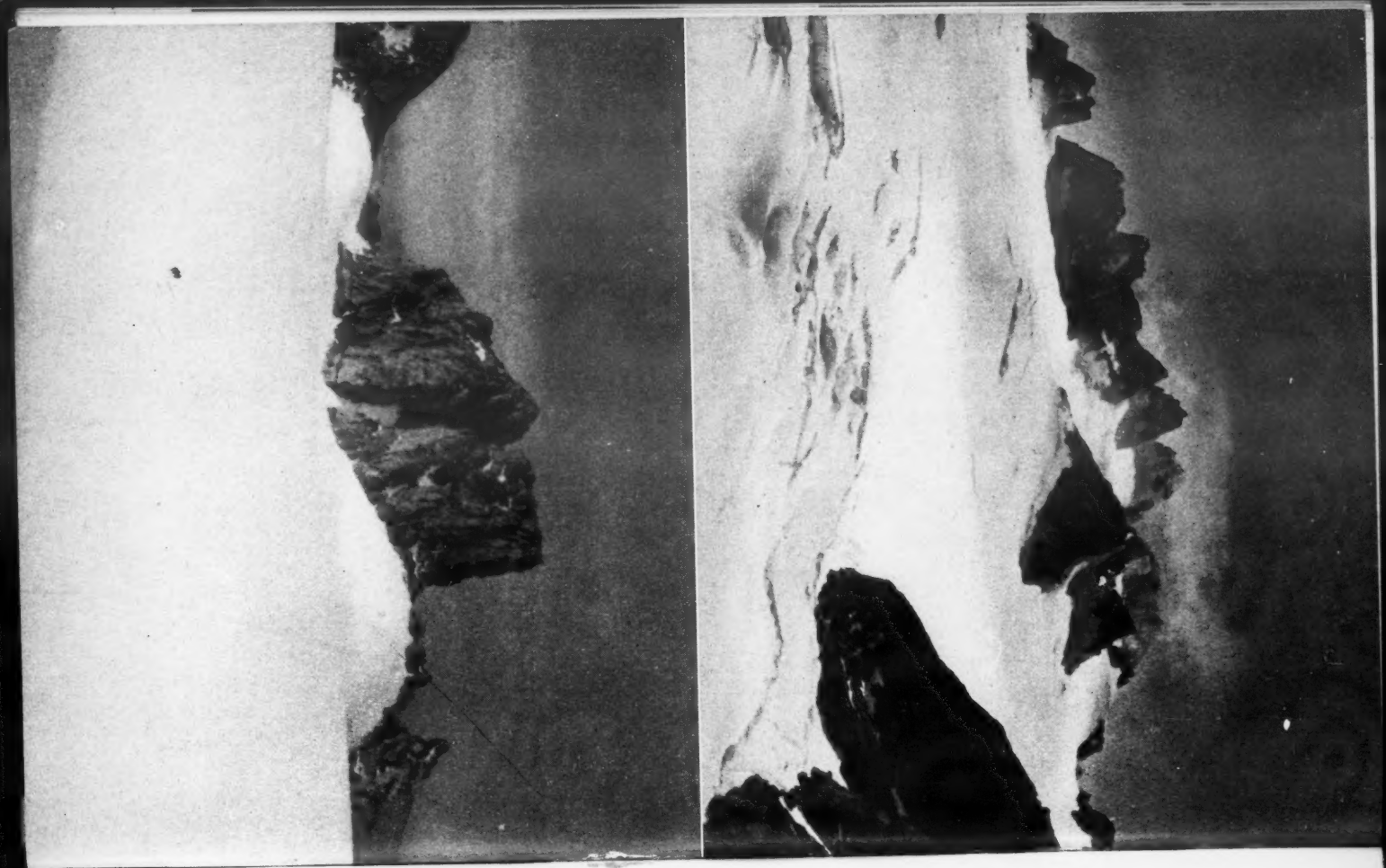
MOUNT WADDINGTON FROM THE NORTHWEST
MOUNT GEDDES FROM THE NORTHEAST
Photos, F. P. Magoun



the day before. From here it looked as if Heartstone Peak would be a relatively easy climb, so we decided to give it a try. Our route went straight up the south ridge, until it came to a cleft. Here we had to descend more than 100 feet and then traverse around to the north ridge, all on steep snow, from which easy rock led to the summit. After building a cairn, we began the long trek to Camp Sunrise, where we arrived just before eight.

On the 21st, Michael and I, with our "guide," set out on the long trip to the east end of the range and Mount Mercator. We told the others that we hoped to be back at seven that evening, but that they should not worry about us until eight. It was good that we allowed the extra hour, for Mercator was a long way off and a rough climb. The route rose straight up a frozen gully in the middle of the west face. Skag stuck with us even after we cut out of the gully along the summit ridge, but one last overhang proved too much for him. From this summit I completed my map of the region in an hour's calculating, and then we started down.

On July 22nd, Michael and I left camp early for Mount Despair (10,500 ft.). The day before, I had picked out a route which looked easy; but things did not work out according to plan near the top. After a rappel, we saw our original planned route, and within half an hour were on top. The descent took some time because of the danger of disturbing large quantities of loose rock; but, once on the flat, we really moved fast, for we had become imbued with a desire to make first ascents in great abundance. Mount McCown fell quickly under our assault on its western snow slope, which led all the way to the summit, 1100 feet above the Sunrise Glacier. Peak 5S (10,000 ft.) and Peak 5N (10,200 ft.: later named Mount Hall) were next. Late that evening as we ate our supper, Michael and I looked with pride at the six summits around us. On top of each a cairn was visible, for we had made five first ascents that day and the other party had climbed Mount Williams. They found the latter a long snow climb, climaxed by several hundred yards of slow, tricky travel along the summit ridge.

As the morning of the 23rd was cloudy and windy, we suspected a new storm, and made haste to go down to Base Camp while we still could. Our route went along the side of Mount

TIEDEMANN PEAKS FROM THE EAST
Left to right: Dentiform, Stiletto, Serra, Asperity, Tiedemann. In front of Asperity is Tellot, before which the party's high camp was placed

MOUNT McCORMICK FROM HIGH CAMP
Note climbers returning across the snowfield

Photos, D. Michael

Schultz to the divide between the East Cataract and Malemute Glaciers, whence we struck out down the East Cataract Glacier to its junction with the main glacier. When Michael and I reached the cache, we noticed three figures coming down from the central Cataract Col. Immediately I sensed that something had gone wrong.

[The tragic death of Charles Shiverick and the expedition's other first ascents are recounted by Fred Beckey in a sequel which we hope to publish in a later number.—*Ed.*]

Beyond the Skyline

ANDREW JOHN KAUFFMAN, 2ND

HALFWAY between the main transcontinental line of the Canadian Pacific Railroad and the northeast arm of Upper Arrow Lake stand the ramparts of the Battle Range. This remote, uncharted and almost legendary system of granite summits—named in honor of a semi-historical hand-to-claw combat between a grizzly bear and a prospector—is the key to one of the most intricate and puzzling structures of the Selkirk mountain system.

The outer defenses of the Battle Range are formidable: in past years at least nine climbing parties, which included the best-known explorers of the Selkirks and experienced American mountaineers of their time, have tested these outposts only to withdraw. Their failure is in no way to their discredit. Precipitous valleys, heavy fallen timber, tangled jungles of slide alder and devil's club, treacherous mountain torrents and polished granite cliffs bar the approaches. Until last summer no man had succeeded in reaching the foot of the main summits, nor had any human being ever been known to stand at the head of the wild adjoining valleys.

Three of us, Norman Brewster, Betty Kauffman and I, determined to emulate our predecessors, and, if possible, surpass their achievements. Frustration was fresh in our minds, for only ten months previously, during a brief reconnaissance, threatening clouds, low supplies, and a final physical obstacle had forced us to retreat. This time, however, we were better prepared. We were ready to confront the unexpected topographical surprises typical of this area. We had carefully studied all past attempts to reach the peaks and had sought advice from local trappers and prospectors. Lastly —and perhaps most important—we had all three climbed together before, and formed a small but well-knit team.

Our objective was to reach the central summits, ascend the highest peak, Mount Butters (about 10,750 ft.), and to climb as many additional mountains as time would allow. Actually, we had little over two weeks at our disposal, although we carried supplies for 24 days.

On July 5th we boarded the train at Revelstoke, B. C., bound for Arrowhead. A delightful boat ride the same afternoon brought

us to Beaton, and that evening a truck carried us over a rough road to the last habitation, eight miles up the Incomappleux Valley.

The next few days witnessed the usual puffing and groaning that seems to dominate the early stages of all extended climbing trips. We relayed two moderate loads eight miles over an ill-kept, winding trail, at one point crossed the Incomappleux River on a cable car, and finally dumped our packs at a trapper's cabin on the banks of Boyd Creek. An additional mile or so of blazed trail and fallen logs took us to the edge of Kelley Creek, a turbulent stream which flows into the Incomappleux at the western end of the Battle Range.

Here two alternatives presented themselves. Either we could slash a trail through thick brush and slide alder to the head of Kelley Valley, or we could scale a steep spur to high ground and endeavor to attain the main summits by traversing the range. This spur, dropping steeply from 9500-foot peaks to the floor of the Incomappleux Valley at barely 1800, consisted of deeply forested slopes, broken by occasional granite bluffs. The average woodsman might well have selected the first of these routes. Not so the mountaineer. We turned into the highlands.

On the 10th, after a two-day uphill fight, we pitched our first timberline camp in a broad basin overlooking the Incomappleux. The basin was largely blocked with spring avalanche snow, and an elaborate search was made before we discovered a spot sufficiently dry and flat for our equipment. Nor was our tarpaulin rigged into a shelter-half a moment too soon. Hardly had we stored our gear when a clap of thunder cracked overhead and high winds began shaking the fabric.

Blowing mists and rain lasted another two days. We managed to bring up the few remaining supplies we had cached on the wooded spur below. In the afternoon of the 12th, the skies appearing somewhat brighter, Norman and I conducted as thorough a reconnaissance of the route beyond as was possible under stormy conditions.

Four ridges, we knew, separated our camp from the foot of Mount Butters. Photographs taken the previous year from the south had led us to expect to find a broad trough, running parallel to the western peaks and leading directly towards the center of the range. We hoped the trough cut through at least two of

ESCALADE PEAK FROM THE SNOW RIDGE LEADING TO MOUNT BUTTERS
Photo, A. J. Kauffman, 2nd

the intervening ridges. Instead, as we reached the crest of the first ridge, hardly an hour out of camp, we stared, dismayed, at the unbroken, boiler-plated walls of the next obstacle beyond, rising into the fog 800 feet above us and some distance away. Indeed, the inner citadel was staunchly defended.

Only a rock-engineer with a beltload of metal and unlimited time at his disposal could have stormed that parapet. To backpack over it was out of the question. We must now resort to the roundabout and somewhat uncertain expedient of climbing over the very tops of the peaks and finding a suitable route down their back sides. We dismissed all thought of skirting the north flanks of the range, for we considered such an effort to be too lengthy and problematical.

As so often happens after an extended mountain storm, the whole world sparkled like crystal next morning. With light loads we started for the first summit, hoping to reach the high pass beyond, which we felt certain separated it from the central peaks of the range. An easy climb up gentle and, occasionally, somewhat less gentle snow slopes, and finally along a wide and beautifully corniced ridge, brought us to the crest of the mountain. We christened this peak Mount Beowulf, and its pyramidal satellite Grendel, in honor of the legendary struggle between these two figures of Anglo-Saxon literature. We then constructed a small cairn and looked around.

Immediately to the north rose the peak which Drewry and his survey party had climbed almost 50 years ago, and which was reascended in 1946 by Erskine and Baker. Beyond could be recognized the familiar mountains of the central Selkirks: the Dawson Range, Purity, Bonney, Sir Donald, Swiss Peak, and, far behind, something that might have been Sir Sandford. In the opposite direction our gaze fell on the unclimbed spires of the Badshot Range, dominated by the slender apex of Mount Templeman, with its classically proportioned flanks flashing in the morning sun. Between these two extremes, due west, in brooding Norse solemnity, stood a somber, massive jumble of mountains: our goal.

The next task was to select a suitable route down the eastern slopes of Beowulf. A short investigation solved our problem. Roped together, we kicked steps down a 45° snow gully towards the glacier 600 feet beneath. The snow was packed, yet soft enough

BATTLE RANGE FROM SOUTH PEAK OF MOUNT DUNCAN
Mount Butters is in the center *Photo, Arnold Wexler*
BEOWULF AND GRENDEL FROM OBSTACLE PEAK
Final camp was on the ridge in middle foreground
Photo, A. J. Kaufman, 2nd

to provide good footing. A touch of caution was required, owing to a gaping though well-bridged bergschrund underneath. Our anxieties, however, were focused in another direction. A rather suspicious-looking cornice overhung the gully, and old avalanche tracks, starting immediately below it, swept ominously along our path. There was a curious mixture of haste and vigilance in our descent.

An hour later we had reached the pass and were within striking distance of the central peaks. The pass consisted of an exposed saddle, situated at about 8000 feet, and covered with heather and a few stunted bushes. On either side steep cliffs dropped almost 700 feet to unnamed glaciers. It was a delightful campsite, with adequate firewood and a few pools of water. However, we did express a little concern as to its suitability in case of storm. Little did we realize at the time how soon we were to find out.

That afternoon we returned to camp, arriving slightly before sunset, still drenched from the effects of a brief shower which had lashed at us as we ascended the steep gully under Beowulf. The following morning, July 14th, we moved the remainder of our gear to the 8000-foot pass and established our advance camp in a hollow about ten feet below the saddle.

Billowing thunderheads hovered on all sides during the afternoon. As evening approached, a vast, threatening cloud-wall moved slowly up from Arrow Lake towards our exposed ridge. Lightning flamed intermittently, the bolts crashing high among distant peaks. One whole skyline cracked with fire. Hastily we rigged our tarpaulin to withstand the storm. Ice-axes, crampons, our rifle, and all metal implements were stored a full 60 yards away. As we closed the flaps, I took a final look outside. A grey, shapeless sheet of clouds surged like an Oriental genie above the last ridge that still separated us from the tempest. Seconds later it dove upon us with cataclysmic force.

For twelve hours we crouched in our sleeping bags. Three successive storms of equal violence swept through the pass. The fabric over our heads banged sharply with each gust of the 70-mile gale. With numb fingers we held on desperately to the flaps, hoping the tarpaulin would not blow away and the seams not split. So intense was the wind and so heavy the rain that, on the few occasions when we peered outside, we could discern no

object more than 30 feet away, even while daylight lasted. Lightning flashed everywhere and thunder boomed loudly in close accompaniment. During a brief lull I reminded my companions how an entire company of Austrian troops was once wiped out by a single bolt of lightning in a similar situation. Apparently my story did not enjoy popularity, for I was promptly ordered to keep my thoughts to myself.

The storm abated towards noon of the 15th. While Norman and Betty spread our wet equipment to dry, I made a short reconnaissance towards the next mountain, which we had named Obstacle Peak, and which still barred access to Mount Butters. Upon my return I reported the discovery of two apparently easy and feasible routes to its summit.

It was still half dark when, on the morning of the 16th, we shouldered light packs and started out on what we knew would be an all-day attempt to climb Butters. We realized that several unknown barriers must lie along our line of assault, protecting the easy snow slopes which, as we had observed the year before, curved upwards almost to the summit. The descent on the east side of Obstacle Peak could be more difficult and take longer than anticipated, and we might encounter trouble in crossing the fourth and last ridge between us and our goal.

An hour out of camp we were temporarily stalled. The spur leading to Obstacle Peak, which I had selected as the best approach, was broken by a huge hidden gap with sheer walls on either side. As crossing it would involve time-consuming and difficult rock climbing, we turned our attention to the other route.

From our present elevation at about 9000 feet, we descended to a bare 7500, traversed a broad, snow-filled basin, and started up a wide snow couloir on its far side. A 2000-foot climb up its twists and turns led us to the mountain-top. This consisted of two summits, both of which we climbed, about 9500 feet high and a few hundred feet apart. Here we obtained our first close view of Mount Butters and its satellites and gained a true picture of the problems still before us.

Behind forbidding granite cliffs and steep snow slopes, with mists drifting over its crest, the summit of Mount Butters loomed a thousand feet above its closest neighbors. Nearer at hand the north wall of a sharp, evil spire dropped vertically a full third

of a mile to the white expanse of an unnamed glacier. We christened the spire Escalade Peak and wondered what lucky mountaineer would first stand on its summit; for surely we three, without pitons or snap-links, were not qualified to make the attempt. Its westerly neighbor, which we called Mount Fafner, was more inviting, but we intended to by-pass these mountains and center our attack on Mount Butters.

In many respects our climb down Obstacle Peak's east flanks approximated our trip over the gully east of Beowulf: steep snow in excellent condition. From the Obstacle-Fafner col—at about 8200 feet—we pressed forward on snowfields south of the range. Once more we had to move downwards, this time 800 feet, then regain our lost elevation, only to drop another 600. At last, around 10.30, we were on the Butters Glacier, beyond the final bastion, with reasonable slopes leading directly to our goal. Barring a sudden thunderstorm, the central stronghold was ours.

Our approach had been difficult and intricate; the actual ascent was to be extraordinarily easy. For over two hours we plodded upwards, until we emerged into a huge snow basin ringed by the four separate crests of Mount Butters. We headed straight for the highest and most easterly peak, and made tentative plans to scale the southwest summit. The other two mountain-tops, on the north side, were scarcely worth attention.

Two feet of fresh snow gave us hard and slow work. It was after 1.30 when we at last covered the top few feet of rock. On the same day, one year ago, and at almost the same hour, Betty and I, with five bearded and frosty companions, had reached the 18,000-foot crest of St. Elias. Surely July 16th was our lucky day.

We gazed around us at peaks which rose like waves on the horizon. Sugarloaf and Duncan looked more distant than we had expected. Both appeared slightly lower than Butters, whose altitude we estimated at approximately 10,750 feet. Far beneath us the dark moat formed by Battle Creek curled around polished granite outcroppings. Somewhere in the east, Houston Creek vanished behind an intriguing serrated ridge, which formed an extension to Butters. The Beaver-Duncan Valley lay hidden in the distance. There, we believed, Sterling Hendricks and his party

must at this moment be preparing to struggle towards the Battle Range. We did not envy them: they had a long way to go.

We constructed a suitable monument and left behind us a cheerful note for our successors, among whom, we thought, would be Hendricks. Then we started back towards camp. A running glissade put us at our starting point below Butters in little more than 45 minutes. At 5.00 we were once again preparing to climb over Obstacle Peak, and towards dusk we stumbled into camp. In our travels that day we had climbed upwards a full 9000 feet and down a similar distance. We had made two first ascents and had scaled one mountain twice. The half pint of rum which I had managed to hide all this time in the bottom of my pack, and which I produced a few moments after our return to camp, was greeted with exclamations of surprise and loud hurrahs.

Next morning we made an abortive attempt on Mount Fafner. As we hesitated whether to go on, some one recalled the excellent beer available in Beaton. No further prompting was necessary: we turned around and headed back. The same afternoon we jettisoned most of our remaining supplies and clambered over Beowulf to our previous campsite. The following day, despite a hair-raising duel with a black bear in the middle of a log-jam, we made good progress toward Beaton, and a few days later we were enjoying more "civilized" mountaineering at the Alpine Club of Canada's summer camp.

Operation White Tower

BRADFORD WASHBURN

THE ORIGINAL idea for Operation White Tower was developed by Paul Hollister, of RKO Radio Pictures, which expects to film *The White Tower* in the Alps next year. This picture will require infinitely more "on location" photography than any other movie produced in years. Furthermore, the greater part of this photography will have to be done at higher altitudes and in much colder weather than most Hollywood productions. Before plunging headlong into a million-dollar project 12,000 feet above the sea and 7000 miles away from home, RKO asked the New England Museum of Natural History if it would be willing to take two of their cameramen and a representative of their publicity department high on a big mountain to familiarize them thoroughly with conditions as bad as the worst they could possibly expect to encounter while shooting *The White Tower.*

It was not Mr. Hollister's idea to have this a small party which would merely study the use of heavy, electrically-operated camera equipment on a large mountain. He wanted to have "Operation White Tower," as the expedition came to be known, a self-supporting enterprise which would photograph a half-hour short subject, while its personnel were learning the limitations of studio equipment on a big peak and while the public was becoming further imbued with the magic words "White Tower."

The New England Museum agreed to undertake this project provided that RKO made it financially possible for the Museum to carry out a number of purely scientific objectives which would make the expedition a thoroughly useful and practical enterprise. RKO promptly and enthusiastically agreed, because such an expedition would obviously result in a much more interesting film than one which simply related the physical story of a mountain ascent with no other objective than reaching the top.

After considerable deliberation, Mount McKinley was chosen as the ideal location for this expedition, not only because it was climatically and photographically ideal for RKO's experiment, but also because the New England Museum was already keenly inter-

ested in carrying out extensive survey work, photography and geologic collecting in that region.

Definite plans for Operation White Tower were not started until late in January 1947, thus allowing barely two months of preparation before the vanguard of the party landed at the foot of McKinley. Because this expedition offered a unique opportunity for the first really lengthy stay on the upper slopes of McKinley, the Museum communicated with a number of different Government departments and private individuals which it felt might profit by cooperative field study. By the end of February, the basic scientific objectives of Operation White Tower were determined as follows:

(1) To undertake Cosmic Ray Research at Denali Pass (18,150 ft.) for the Physics Department, University of Chicago, which agreed to furnish all equipment and an experienced observer to accompany the party in the field.

(2) To make a thorough survey of the area around and to the east of McKinley and of the approaches to McKinley from Wonder Lake. This was to be done both on the ground, with equipment furnished by the U. S. Coast and Geodetic Survey, and from the air by the B-29's of the 46th Reconnaissance Squadron of the Army Air Forces.

(3) To undertake a geological collection between McGonagall Pass and the tops of both peaks of McKinley in order to tie into the work already done in the adjacent lowlands by the U. S. Geological Survey.

(4) To compile a detailed weather record with instruments furnished by the U. S. Weather Bureau.

(5) To permit representatives of the Army Air Forces and Army Ground Forces to carry out field tests of various articles of new equipment and food throughout the course of the expedition.

(6) To film a photographic story in movies and still pictures to document the efforts of the party to achieve these various objectives.

Because the major scientific goal of the expedition was cosmic ray research in Denali Pass, the Army Air Forces agreed to furnish air support in order to effect the establishment of this special high-altitude camp. The Alaska Communications System also offered to help by setting up at Wonder Lake a radio relay station which would make possible constant reliable contact between Anchorage and all the camps on the mountain—coordination essential to effi-

cient air support. The National Park Service not only permitted the use of the Wonder Lake Ranger Cabin as a radio station, but also allowed Chief Ranger Grant Pearson to accompany the party on the mountain.

The personnel of the party was rapidly chosen during February, but never met as a group until we all reached Anchorage late in March. The Museum was extremely fortunate in being able to gather together so experienced, able and congenial a group on such short notice:

Anderson, Carl (horses); Browne, George (artist); Christensen, Hakon (pilot); Craig, Robert W. (American Alpine Club); Deeke, William (RKO cameraman); Gale, James E. (representative of the 10th Rescue Squadron); Hackett, Lt. William D. (representative of the Army Ground Forces); Lange, G. Robert (University of New Hampshire); Norris, Earl (dog driver); Pearson, Grant (Chief Ranger, McKinley Park); Shannon, Leonard (RKO); Solberg, Sgt. Harvey (radio operator); Sterling, William (RKO); Victoreen, H. T. (University of Chicago); Washburn, Bradford, and Mrs. Washburn (New England Museum); and Wellstead, George H. (RKO cameraman).

The organization of an expedition to Alaska in 1947 was very trying. Not only were we beset with incredible difficulty in obtaining almost every single item of equipment, but steamship freight to Alaska was hopelessly snarled by labor trouble, and the only reliable means of travel was by air. Accordingly Northwest Airlines was used, and during March and April this line carried eight passengers and over 11,000 pounds of freight from Minneapolis to Anchorage without the loss of a single item. In one instance a load of air freight was actually carried from Boston to Muldrow Glacier in slightly less than 48 hours' elapsed time!

The snow and weather conditions on McKinley naturally determine the best time of year to attempt the climb. Unfortunately the best never occur simultaneously. The best weather appears to be during July, the best going underfoot during April and May. Airplane landings on Muldrow Glacier are dubious after April 20th, though they have been made successfully as much as three weeks later. What determined April 1st as the date of establishment of Base Camp at McGonagall Pass was the great weight of the professional movie equipment (over 500 lbs.) which had to be carried

to at least 12,000 feet. We planned to use a dog-team in order to minimize a huge and already unavoidable back-packing program, and dogs cannot work efficiently on the lower Muldrow Glacier much later than June 1st.

George Browne * and Bob Lange reached Anchorage on March 15th, at once setting to work with Jim Gale to sort freight and to prepare it to be flown to the Base Camp or dropped at other points on the mountain later in the spring. The Alaskan Air Command generously provided part of a Quonset hut in which all the freight was stored and sorted, except for the frozen meat and Birdseye food, which was handled at Castner's Cold Storage in Anchorage. The Tenth Rescue Squadron, to which this Quonset hut belonged, was assigned the job of handling all of our aerial liaison by General Atkinson, the air commander of this theatre.

Advance operations were carried out speedily and ahead of schedule. On March 17th Gale and bush pilot Hakon Christensen made the first landing on Muldrow just below McGonagall Pass. They used a small Waco cabin plane and carried a light load of canned gasoline. The purpose of the flight was mainly to mark the 3000-foot landing strip with twigs and to test snow conditions to see if they were satisfactory for a heavier plane. An unbroken spell of evil weather prevented even an attempt at another flight until the day after the whole party was assembled in Anchorage.

An unusual streak of excellent spring weather made flying to the glacier safe and easy. Christensen and Gale made a second trip with a 2000-pound load in a Norseman plane on March 28th, and two days later Browne and Lange were landed at McGonagall Pass and set up the nucleus of Base Camp on March 30th. The Wonder Lake radio station for relay of our messages, together with three months' food supplies for the operator, were flown in on April 1st and 2nd. Sgt. Harvey Solberg, our efficient Signal Corps operator, assisted by Mr. Moore, a Signal Corps engineer, had this station (WXE-2) operating perfectly by April 3rd.

Day after day of warm clear weather in Anchorage was fast melting the snow off Hood Lake, whence we were taking off for our ski flights to the mountain, and we literally worked day and night to get our personnel and freight in to Base Camp before the ice began

* The son of Belmore Browne, who had an old family score to settle with Mt. McKinley.

to rot seriously. While temperatures at Base Camp dropped to 20 and 30 below at night and hovered just above zero in the daytime, spring hit the seacoast in earnest. Anchorage became a sea of slush.

On April 12th Gale, Victoreen and Shannon landed on the glacier with our last load of freight, and the expedition as a whole went to work in the field. Gale, Pearson, Craig and Hackett spent most of their time reconnoitering up-glacier and establishing a safe, practical route for dog-teaming. The two icefalls of Muldrow were very badly crevassed this year—far worse than I could recollect from 1942 or Grant Pearson from the 1932 expedition. Hence several days were spent on a job that otherwise would have been very simple. Two of the advance guard took nasty spills into deep, hidden crevasses before a good route was discovered and marked out. An advance camp to facilitate this reconnoitering was set up in the middle of the first icefall at 7200 feet, six miles above McGonagall.

Meanwhile Bill Deeke and George Wellstead, of RKO, worked furiously on their film; and Lange and I began observing from the survey stations according to the plan of operations supplied us by the Coast and Geodetic Survey. We also completed a collection of geologic specimens typical of the McGonagall granite and Birch Creek schist, the two dominant formations in the lower Muldrow area.

The method which we used for making our long survey shots between the hills just north of Muldrow Glacier and the main control station at Wonder Lake, 20 miles away, was simple but very successful. On our 8 A.M. radio schedule with Wonder Lake we made another schedule three hours later. By then we had packed our light Forest Service SPF radio telephone set to the top of McGonagall Peak, 800 feet above camp, and set it up beside our theodolite. The theodolite was focused on the Wonder Lake Ranger Cabin, where Sgt. Solberg ran our radio relay station, about 100 yards from the key survey station in the Wonder Lake area. At 11 A.M. we contacted Solberg on our radio and told him we were ready to observe. He took a large mirror over to the survey station and kept flashing us with it till we told him on the radio that we had made the necessary number of repetitions of our angle and that they checked properly. This system required flawless visibility between these points as well as good radio and survey teamwork. The survey work was bitterly cold, as the lowlands around Wonder

Lake were rarely clear except with a light cutting northerly or northeasterly breeze. Later on, this same system was used successfully from both Gunsight Pass and Browne Tower.

On April 15th Earl Norris, our dog driver, arrived after the 100-mile overland trek from McKinley Park headquarters, which he covered in four days. By the time the dogs reached camp, our vanguard had marked a route up to our first advance camp, and Norris started relaying supplies forward as fast as possible.

Ten days later the second group of our party moved ahead from Base Camp to Camp I (7200 ft.), and there joined Gale, Pearson, Craig and Hackett about two-thirds of the way up the lower Muldrow icefall. Gale, who is the Alaskan Air Command's top expert on cold weather rescue operations, is also an expert at igloo-building. By the time we reached Camp I, he and his eager pupils had constructed two fine big igloos for sleeping quarters.

I believe our use of igloos on Operation White Tower is the first time that they have been steadily relied upon as shelter on a major mountain expedition. They were wonderful. Although they were somewhat humid and never could be kept really warm inside, they were never at all cold. They did not flap in a gusty wind. They did not have to be dug out after a heavy snowfall. Almost best of all, once built, they were up for weeks, as long as the weather stayed cold. On a cold night, the temperature dropped to 15 or 20 below zero inside a tent almost the moment the stove was turned off, even though it had been 60 or 70 above with the heat on. Inside the igloos we always had to ventilate in order to keep the daytime temperature, even when cooking, down to about 35 degrees above; *but,* with the stove off and vents nearly closed after bedtime, the igloos rarely got colder than 20° above even when it was bitterly cold and windy outside. When we broke camp, we simply rolled up our sleeping bags and crawled out, just as if we were leaving a house. If we had to reoccupy a camp that we had evacuated a week or two before, all we had to do was shovel a drift of snow out of the doorway, open the vent in the roof, and set up housekeeping. Although above 11,000 feet we did a lot of cooking in igloos, we preferred to have a separate cooktent. The 8-by-10-foot (oval-shaped) igloos slept three to four men comfortably, but the 9-by-12-foot wall tent was far more practical as a chow tent for the full 13-man party.

While the vanguard again pushed ahead to establish a camp at 8500 feet, halfway up the Great Sérac, Earl Norris and I returned for a day to McGonagall to meet Bill Sterling, our new correspondent, who had been sent from Hollywood to replace Shannon. Poor Sterling was flown almost non-stop from broiling California to Muldrow Glacier in three days. He barely got in, as the ice on Hood Lake had completely rotted away. Christensen was forced to fly his plane to the Cook Inlet mud flats at low tide in order to be able to take off for his last flight to the glacier on skis. The sight of his snappy red Waco plane with eel grass and mud all over the skis and struts was a fond reminder of the thrilling flights we had made from the Valdez mud flats to Lucania with Bob Reeve ten years before.

The Muldrow icefalls were in wretched condition. Although there had been reasonably heavy winter snows and no early spring thaws at all, it had been a very windy year. The big crevasses were completely uncovered and far worse to navigate through than in July 1942. Our route up both icefalls was so tortuous that in several places 200 yards of trudging through deep snow would net us only 30 or 40 feet forward up the glacier.

We had no air-drops between McGonagall and 11,000 feet; hence our packing program of 600 pounds of movie gear and about 500 pounds of dog-food in addition to our own food, clothing and camping equipment was very heavy. The last load was hauled into the Great Sérac camp (Camp II) on May 8th, three days after our first reconnaissance had reached the lower col of Karstens Ridge.

It was our hope to carry out a week of intensive glacier motion experiments at Camp II; but, to our dismay, preliminary observations showed the glacier moving only 15 inches per day at this point. The type of observations needed for the experiments we wished to make required at least three feet of movement per day, so this project was promptly dropped. Below 11,000 feet, Muldrow appears to be moving very slowly even in its steepest portions. At McGonagall Pass sand cones observed on the ice near the pass in 1942 and 1944 appeared to be in almost exactly the same place in 1947, and the big avalanche moraine at the corner of the glacier, four miles above McGonagall, seems to have advanced only about a half mile in the 15 years since the Carpé-Koven disaster.

MOUNT McKINLEY FROM THE WEST

Photo, B. Washburn

On May 12th, after a wicked siege of back-packing movie equipment, batteries, food and a dozen sacks of evil-smelling dried fish (dog-food) up the Great Sérac, our last contingent arrived at 11,000 feet, where Jim Gale and Victoreen had already established a splendid three-igloo village. This was the end of the trail for Earl Norris, George Wellstead and the dogs. The glacier back-packing was concluded two miles below Camp III, and Norris relayed supplies up to camp in a series of short heavy loads from a large cache just above the Great Sérac, while the rest of us lost no time in going to work on Karstens Ridge. The Tenth Rescue Squadron made two drops of dog-food, gasoline, and other equipment at this camp; and we were rapidly set up there for a stay of nearly four weeks.

Up until this time we had advanced slowly and methodically. We had reached the glacier early in April to assure safe landings and takeoffs for our airplane, but we had had no desire to get onto the high part of McKinley before mid-May because of the fierce winds and extreme cold there at that time of year. We had therefore devoted our time to various chores—surveying, painting, geology, photography and glacial motion—while the sun rose higher in the sky and spring came to the lowlands.

In sharp contrast to the wretched conditions of the lower glacier, Karstens Ridge was in excellent shape, windpacked and covered with from one to three feet of fresh drifted snow. Gale, Craig and I made a swift reconnaissance to Browne Tower (14,700 ft.) on May 13th, leaving fixed ropes on the ice-step at 13,000 feet and on the "coxcomb," 500 feet higher, where treacherous windslab conditions seem to prevail almost always. We had a surprise and thrill that day when we discovered the fixed rope left by our Army party in 1942 still firmly attached to a picket at the ice-step. The rope was in such good shape and the picket still so soundly stuck in the ice that we actually fixed our new rope through a loop in the old one! About 18 inches of blue ice had accumulated during the five years since 1942.

We easily relocated both the 1932 and 1942 caches at Stuck's old Browne Tower campsite. The real disappointment of the day was the discovery of the two minimum recording thermometers left near these caches in 1942: one minimum indicator read 60 degrees *above* zero, the other read 40 below, neither a very close second to the

LAST 5000 FEET OF MOUNT McKINLEY FROM THE SOUTH
Photo, B. Washburn

almost incredible minimum reading of Archdeacon Stuck's thermometer found in 1932 after a lapse of 19 years.*

The need for fixed ropes on any part of Karstens Ridge is negligible for an ordinary climbing party, but they were a godsend for our frequent relays with heavy packs. George Browne, I believe, holds the all-time record for packing on the ridge by carrying up a 94-pound load on one trip! Despite excellent air liaison both below and above the ridge, we undoubtedly packed more food and equipment up it than any previous party. This was done in order to set up reliable camps at 12,000 feet (IV) and at 14,700 feet (V), so that trips between 11,000 and 18,000 feet could later be made without the slightest delay or danger of being caught somewhere without food or shelter. We had one igloo at 12,000 feet, two igloos at Browne Tower (14,700 ft.), and another large igloo at 16,500 feet on the plateau between the two great icefalls of Harper Glacier.

On April 30th the Tenth Rescue Squadron's B-17 had dropped five cases of 10 in 1 rations free-fall in Denali Pass on a pre-arranged schedule, while we were winding our way upward through the crevasses of the first Muldrow icefall. Unfortunately a case of gasoline and a ski-sled dropped by parachute at the same time missed the target completely and were irretrievably lost down the bottomless abyss to the west of the pass. Knowing that there was no gasoline at Denali Pass, we took more than originally planned up Karstens Ridge. We were confident of finding the rations in the pass, as they were packed in large orange wooden boxes at least twice the size of ordinary ration cases and would almost certainly be blown clear by the terrific gales that sweep the pass throughout the year.

Victoreen, Hackett and Gale spent the night of May 14th in the igloo at 12,000 feet on the first flat gable of Karstens Ridge. The next day, as they advanced to Parker Pass, Barbara and I moved up to 12,000. The following day in dense, impenetrable fog we climbed to Browne Tower together and joined the others. Up to this time Operation White Tower had been clicking right on schedule, but now old McKinley started to cut up in earnest.

* When found by the Lindley-Liek party in April 1932, Archdeacon Stuck's alcohol thermometer registered "lower than the minimum range of the thermometer, 95 degrees below zero Fahrenheit." The accuracy of this instrument has been questioned. The thermometer left near the summit by Belmore Browne in 1912 has not yet been discovered. See *A.A.J.*, II (1933), 39; V (1943), 12; V (1945), 433-4.

As we had approached the peak and worked on the foothills in April and early May, we had seen scarcely a day when the summits above 15,000 feet had not been capped in clouds and ripped by furious northerly and southwesterly gales. Regardless of how calm and nice it might be in the lowlands, the top of McKinley was an almost constant inferno in the spring of 1947. In fact, between the time I landed on the glacier (April 10th) and the end of the expedition (June 30th), there were only five days on which the summit could possibly have been attained with any degree of enjoyment.

We spent one full day (May 17th) surveying and igloo-building at Browne Tower, and then started up the Great Basin. The weather being perpetually fierce, we decided to attack Denali Pass forthwith, regardless of conditions, rather than to wait a seemingly endless time for a pleasant day. Gale and I had camped a good deal together before, and I knew the Great Basin intimately from past experience, so we became the logical vanguard of the party for the next advance. Barbara, Hackett and Victoreen acted as support at Browne Tower, and the remainder of the party busied itself by taking 35-mm. movies of Karstens Ridge at every possible clear moment.

All five of us climbed from Browne Tower to the top of the first Harper Icefall on May 18th and left light loads there, marking an excellent and easy trail in perfect snow conditions, which did not even require snowshoes on the level 15,000-foot plateau. As expected, the weather did not improve, and Gale and I moved into the 16,400-foot camp on May 20th in a gathering southwester. We put up our tent in a gusty 40-mile wind which rapidly increased to 60 or more. The thermometer, which had dropped to better than 20 below zero during the last two nights at Browne Tower, rose to $-10°$ minimum, and a wild blizzard raged about us for 18 hours. The wind abated a bit on May 21st, and we hustled up the glacier a third of a mile to the bottom of the next icefall (16,500 ft.). There we spent as unpleasant an afternoon as I have ever experienced, building an igloo in dense fog, gusty wind and drifting snow, with the mercury barely above zero. It takes 40 to 50 blocks of snow roughly two feet square and six inches thick to build an igloo. I did the quarrying of the rough blocks with a 30-inch handsaw. Gale tapered them with a machete and set up the igloo. A big igloo is an easy half-day job for two men at 10,000 feet, but at 16,500 we labored for four hours and

had not even started the tunnel entrance when we retreated to our near-by camp at six in the evening, looking more like snowmen than human beings. As we groped our way back to camp through the storm, we discovered a little dead bird (Lapland Longspur) lying in the trail. This and a Redpoll found dead after a storm at 17,700 feet a week later are the highest records of wild life ever found on this continent north of Central America.

The next morning we broke camp in a fierce gale, and moved up to the igloo, finished the entrance, and left our equipment there. Then we climbed to Denali Pass in an infernó of blowing snow and located four of the five cases of rations which had been dropped there three weeks before. This gave us an excellent food reserve, but our gasoline was running very low. As the storm redoubled its fury that night and through the next day, we used our fuel only for cooking. We went to bed when we got cold. We were in constant contact by radio with the camps at 11,000 and 15,000 feet, where both were taking a terrible lashing from the gales. Hackett and Victoreen managed to carry up some gasoline and equipment to us in a lull the same afternoon we reached Denali Pass, but Victoreen's Geiger counters, which were the key component of his cosmic ray apparatus, were still cached at 16,400. They intended to bring them up to the igloo that day, but the storm increased again after lunch and they decided to carry them forward on another trip. In fact they reached Browne Tower in a veritable tempest of wind and snow on their return journey. Few if any of our movements above 15,000 feet that week could possibly have been made without a thoroughly willow-wanded trail.

Jim Gale and I at the 16,500-foot igloo were less than a two-hour walk from Denali Pass, but the weather above the igloo was fantastic. For 48 hours we never even went outdoors. The wind outside was at least 90 miles an hour, and the radio from 11,000 cheerily reported 100 miles of wind, two tents blown flat (one of them a new Army pentagonal tent), and all hands holding down the cooktent for dear life. Barbara reported savage gusts, dense fog and heavy snow at Browne Tower. McKinley Park Headquarters, 14,000 feet below us, reported a heavy warm rain and the buds coming out on the trees!

The Great Storm, as we came to call it, abated a bit more on May 26th, and Gale and I hastily moved our tent, two days' food

and a gallon of gas to Denali Pass in two relays; but again the lull was only a matter of a few hours. By supper time the tempest hit us again with redoubled fury, and we had an unpleasant night in a wildly flapping, half-buried tent, spoiled as we were after the comparatively quiet, peaceful life in our igloo at the camp below.

Dismal news reached us that night. Victoreen and Bill Hackett had carried a load up to the igloo at 16,500 feet from Browne Tower and had been unable to find any trace of the precious bundle of Geiger counters at the 16,400-foot cache. The storm prevented a really good search, but the area all around the cache was honeycombed with huge crevasses, and it looked as if the whole bundle had been blown away by the gale. Inasmuch as a Geiger counter is as important in a cosmic ray outfit as an engine is in an automobile, this report made a bad night even worse. One of the key objectives of the expedition had been to carry out the cosmic ray experiments at Denali Pass. It appeared that McKinley had again successfully thwarted efforts to do cosmic ray work on her slopes.* Victoreen sadly told us that it would be virtually impossible to replace the lost counters in less than a month. We wired the bad news to Dr. Schein, of the Physics Department at the University of Chicago, dug the tent out again, and started supper with our last gallon of gasoline.

The Great Storm finally fizzled out after nine days of almost ceaseless blizzard, and on May 30th Barbara, Victoreen and Bill Hackett advanced to join us at Denali Pass. An air-drop the night before had solidified our position beyond all question by giving us 20 gallons of gasoline and additional food to bolster the four cases of rations which we had retrieved from the advance drop of a month before.

While we strengthened our foothold in Denali Pass, Craig, Lange, Deeke, Pearson, Browne and Sterling moved up to Browne Tower in two shifts. Then came really good news. A telegram from Dr. Schein in Chicago told us that all the Geiger counters had been miraculously replaced, were already on their way to Anchorage by air, and should arrive by June 6th. Our happiness knew no bounds. The Tenth Rescue Squadron also improved our morale. They made several flights over camp to drop, both free fall and by parachute,

* See *A. A. J.*, II (1933), 45 ff.

an 800-pound knockdown insulated house for the cosmic ray work, and 2000 pounds of food, gasoline and equipment for army tests.

On the evening of June 5th, Barbara, Bill Deeke and I reconnoitered a trail to 19,200 feet on the South Peak and Hackett and Lange chopped a route out of the pass up the steep 800-foot buttress of the North Peak. When June 6th dawned clear, cool (−27°) and windless, we were ready to move in either direction.

At 10.30 A.M. of the 6th, Barbara, Deeke, Pearson, Craig, Hackett, Lange, Gale, Browne and I set out for the South Peak, armed with loads of survey and photo equipment which averaged about 40 pounds apiece. Conditions were perfect. The snow had been windpacked to the consistency of concrete by the Great Storm, and our crampons cut into it little more than they would have into the surface of a skating rink.

We followed a new route. In 1942 we had wallowed to the top up the old trail on the northeast side of McKinley's summit cone. The prevailing southwest and south winds at this time of year appear almost always to bury the lee side of the cone beneath a deep mantle of fluffy powder. Our new route followed the crest of the westerly buttress of the South Peak, which connects it and the Archdeacon's Tower to Denali Pass.

The ascent of the last 2000 feet of the South Peak is downright easy from a climbing standpoint. The only difficulties which one can expect to encounter are extreme cold, wind, and the usual discomforts of relatively great altitude. Most of these are minimized by the new western approach. Not only is the ridge well windpacked, but its position makes it possible for one constantly to watch the southern and western horizons for bad weather. Nine-tenths of McKinley's bad weather comes from the southwest, a direction impossible to watch from the old northeast approach; hence the unfortunate experiences of the Parker-Browne party of 1912.

We had a beautiful climb through almost cloudless and windless skies. Views of the North Peak, Mount Foraker and the great abyss to the southwest of McKinley at the head of Kahiltna Glacier were impressive and never-to-be-forgotten. At no point were we ever on a sharp or corniced ridge until we reached the last 200 yards of great ice hummocks just below the top. Our only disappointment came when a pounding heart forced Grant Pearson to turn back just above 19,000 feet.

We had a late lunch halfway up the big western snowslope, after crossing the broad flat plateau between the summit and the Archdeacon's Tower. A half hour of ploughing through deep snowdrifts after lunch brought us to the summit ridge at 3.30 P.M., and there the weather abruptly changed.

The temperature was about 20 below zero, and now an icy southeast breeze hit us as we tackled the steep summit drifts. The skies to the south and southwest were rapidly clouding in, and a high milky overcast sped above us to take the place of the clear blue of the forenoon. Barbara, Hackett and Lange pushed ahead while the rest of us lingered a bit behind to take pictures of their arrival on the top. At 4 P.M. their tiny black forms snailed their way up the final drift; and McKinley had been climbed for the fourth time, the first time in history by a woman.

Twenty minutes later the rest of us joined the already frigid little party on the summit. To our complete amazement, Barbara had just discovered the bundle of willow wands jammed into the summit drift by Bob Bates in July 1942. They were not covered by snow and not more than three feet from the actual top. Almost all the black paint had been sand-blasted off them by five years of wind and snow.

A blustering southeast breeze and lowering clouds made my second visit to Denali's peak a sad contrast to the beautiful afternoon when we had lolled there in the balmy sun of July 1942. This time we had not only unpleasant weather but also work to do. By the time I reached the top, Hackett and Lange had the theodolite set up; and we at once started to swing the three key angles desired by the Coast and Geodetic Survey. Special care was given to obtaining accurate readings on the North Peak and Mount Silverthrone, which are key points in the ground control of the McKinley region.

By the time the survey work had been completed and the angles checked, our fingers were numb with cold and the once-clear valleys below us were rapidly filling with gray, evil-looking clouds. After a hearty handshake all around, we bade farewell to the windswept summit at 5.30 P.M., leaving an eight-foot bamboo survey marker and orange flag on the top of the highest drift.

It is a mystery how little one feels the altitude going downhill. We stopped only once, just below the summit, to clamber 80 feet down a very steep, crusty slope on the south side in order to collect

geological specimens of the McKinley granite. As we descended, the weather steadily improved. We sauntered happily across the upper plateau, past the Archdeacon's Tower and down the ridge toward Denali Pass. The cirrus veil which had obscured Foraker since early morning lifted and dispersed. A glittering sea of cumulus clouds surged against the western precipices of the North Peak. Tiny lakes on the lowlands appeared here and there through rifts in the fog, shining brightly despite the dense afternoon haze. As we reached camp, the skies completely cleared, the thermometer dropped to 24 below zero, and we had one of the finest evenings of the whole expedition.

The following day dawned cloudless, crisp and still. Though we were not too eager to set out on another climb immediately after our chilly experience on the South Peak, we vividly remembered the weather of the last two months and felt that we had better profit by clear skies while we had them! Fortified by a monstrous breakfast of fresh grapefruit, cereal, bacon and coffee, we set out for the North Peak at ten o'clock, again laden with survey and camera equipment.

The North Peak, unlike the South, is by no means a snow dome. Its sharp crusted summit is immediately underlain by the jet black rocks of the Birch Creek schist. A thousand feet beneath this schist lies the massive intrusion of the yellowish McKinley granite, which forms the core of the whole mass of McKinley. This little black sedimentary cap on the North Peak has been thrust up nearly four vertical miles out of the lowlands in one of North America's greatest faults.

Two hundred yards east of Denali Pass the snowfields of upper Harper Glacier climb steeply up into this black schist. Following Lange and Hackett's 400-foot staircase in this icy snow, we worked our way out onto the precipitous slaty rocks. We then traversed a series of snow-covered platforms and jagged, frost-loosened ledges to the crest of the cliffs 800 feet above Denali Pass. The views of the South Peak and Mount Foraker during this climb were truly magnificent.

Once atop the first crags above the pass, one is startled to see the summit cone of the North Peak, still over half a mile away, on the other side of a broad, gently-sloping snow saddle. Trail markers are probably more essential here than during any other part of the ascent of McKinley, for there is not a profusion of easy routes up the cliffs

above Denali Pass, and if one were caught in a sudden storm near the top of the North Peak, loss of the trail on the return journey might easily prove disastrous.

Bill Hackett, Shorty Lange and I, carrying the survey and photographic gear, went ahead. The others, ably led by Bob Craig and Jim Gale, followed a half-hour behind us. Leaving the rocks just after noon, we descended easily across the firm-packed snow of the great saddle and had a bite to eat on a ledge at the base of the final cone. Thence we zigzagged upward, first on broken rocks, then on snow and crust, till we attained the crest of the spectacular summit ridge a few hundred yards west of the peak.

Never before have I seen such fantastic precipices as on the northwest face of the North Peak, called Wickersham Wall after the pioneer Alaskan judge who first assaulted this side of the mountain in the spring of 1903. This tremendous glaciated rampart drops more than 14,000 vertical feet to the surface of Peters Glacier in a staggering series of snow slopes, hanging glaciers and jagged rocky cliffs. As we peered gingerly over the edge, we realized that we were looking down one of the greatest precipices known to man.

The final ridge of the North Peak was uncorniced when we climbed it, extremely steep to the north and quite gentle on the south. The usual afternoon clouds were rapidly obscuring the plains to the north, but beyond the beautiful white dome of the South Peak, the whole Chulitna Valley lay cloudless beneath the clear blue sky. There was not a breath of wind. The temperature hovered around ten below zero, and the sun actually beat warm on our backs as we clambered to the top of the final pointed drift.

The view from the North Peak far excels that from the South. The South Peak itself, moulded by ever-changing shadows as the sun slowly swings around behind it, Browne Tower and the Traleika Basin, seemingly close enough to touch, and the long twisting course of Muldrow Glacier all contribute to a breath-taking panorama.

Surveying from the North Peak, although not to be recommended as sport at ten below zero, was still a picnic compared with the job the day before on the South Peak. We were lucky to have such perfect conditions, because the North Peak, speaking purely in terms of survey importance, is a far more useful station than the South Peak. The domed top of the South Peak is hard to identify

precisely from any direction, even with a powerful instrument, while the North Peak has a distinct summit.

The weather was so perfect that we surveyed, photographed and drank in the magnificent view for three full hours atop the North Peak. The others joined us for an hour, then left an hour before we did. Finally at 5.20 P.M., as the shadows lengthened in the valleys and a sharp bitter breeze started to blow from the south, we took a last look at Peters Glacier and its great abyss, then headed downward toward home. A more perfect day on the heights would be hard to imagine.

Victoreen's hut was nearly done when we returned to camp that night, but the Geiger counters had not as yet reached Anchorage. As it was clear that we might have more delay in getting the cosmic ray work started, next morning Bill Sterling, Pearson and Browne descended to Camp III at 11,000 feet in order to lessen food and fuel consumption at Denali Pass. It was amazing to see how much we were eating at that camp despite the altitude. I attribute this entirely to two factors: all our cooking was done in pressure cookers, which assured the food being thoroughly cooked despite the altitude; and all of our fruit and vegetables were Birdseye frozen, with the result that the food was not only delicious, but far higher in vitamin content than the best dehydrated products.

We ate much more palatable and better balanced meals at Denali Pass than we had in Anchorage! High-altitude appetite is certainly finicky and unpredictable. For example, none of us had the slightest desire for cocoa or chocolate above 12,000 feet, though both were coveted delicacies below that. Basically, however, fresh fruit and vegetables, frozen meat and toasted fresh bread and butter seemed to taste just as well at Denali Pass as they do at sea level.

Survey work and geologic collecting near our high camp were concluded on June 8th. As dog-food and fuel were beginning to run low at 11,000 feet and a complicated survey program still awaited completion at Wonder Lake, on the 11th, Barbara, Craig, Hackett, Deeke and I descended to the head of Muldrow leaving Jim Gale, Shorty Lange and Victoreen to handle the cosmic ray program as soon as the Geiger counters could be parachuted. The counters were now in Anchorage and the weather fine, but, as luck would have it, the plane was out of order!

No sooner did we reach Camp III* than another furious southwester swept the mountain, leaving in its wake nearly three feet of fresh new snow. We wallowed down to the 7700-foot plateau between the two séracs after the storm abated, our old trail heavily buried, but still well-marked and firm through the crevasses. With exposed film, geologic specimens, survey and camera gear, we were loaded down with well over half a ton of equipment.

On the 16th we had a splendid warm spring day. Starting at 2 A.M., we made three back-pack relays through the crevasses of the lower icefall, piled up a cache below it for the dogs to haul down later, and reached McGonagall Pass in mid-afternoon, footweary and sunburned red as lobsters. That night, as we enjoyed the fragrance of alpine flowers and moss, we watched the B-17 parachute Vic's Geiger counters safely in Denali Pass.

The next two weeks were among the most pleasant I have ever enjoyed in Alaska. The weather was splendid, and Superintendent Frank Been loaned us a Park Service truck, which greatly facilitated completion of survey work at our four key stations between Eielson and Wonder Lake. We spent a genial evening with Johnny Busia, the lone resident of Kantishna, and caught dozens of luscious grayling in Moose Creek. Meanwhile, Victoreen and his companions put the finishing touches on a large and carefully-protected cache of food and equipment at Denali Pass and started the long descent.**

On the same day, Carl Anderson and I took off on a three-day pack-trip to the head of Muddy River and Peters Glacier; but, hampered by a storm, we never saw McKinley once during our three-day trip. On horseback all the way, we succeeded in going to the very bottom of McKinley, five miles above the snout of Peters Glacier, where we found a broad grassy meadow (4550 ft.), doubtless where Wickersham and Cook had camped in 1903. Above us the great wall of the North Peak rose fully 15,000 feet into a sombre curtain of fog, sleet and rain.

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* Passing on Karstens Ridge the three-man party led by Gordon Herried, of the University of Alaska, which later reached our 16,500-ft. igloo and returned without climbing higher, because of the acute illness of one member of the party.

** Minimum recording thermometers given the expedition by the American Alpine Club Research Fund were left in large rock cairns at Denali Pass, Browne Tower and McGonagall Pass.

On June 30th Jim Gale, Victoreen and Lange waded the McKinley River and arrived safely at Wonder Lake. Operation White Tower was now at an end. Our party had been on McKinley for 92 days. We had completed our entire scientific and photographic program except for glacier motion studies—and it was not our fault that Muldrow did not move quite fast enough! Over one hundred dollars worth of first aid equipment still lay unused in its box, minus a few aspirin tablets, sleeping pills and adhesive tape for the inevitable crop of blisters!

As we drove eastward toward Park Headquarters, McKinley reared her twin summits behind us all day—the only time in over 100 days that she had been totally clear from sunrise to sunset. Our expedition had not only attained its objectives but it had been one of the most perfect social experiences I have ever had in the mountains. Although report would have it that we frolicked up McKinley nibbling fresh strawberries, with a daily rain of parachuted supplies, I think it only fair to state in conclusion that, despite the wonderful assistance of the Alaskan Air Command and pilot Christensen, we still sledged and back-packed more equipment up McKinley than any other party. The loan of Grant Pearson by the Park Service and the loan of Earl Norris by the Weather Bureau both helped us inestimably; but, when all is said and done, it is teamwork rather than individuals that climb a big mountain. It was with a keen sense of sorrow that our party at last broke up and headed homeward after a splendid and unforgettable experience.

UPPER MULDROW GLACIER

A badly crevassed area seen from the northeast. The "Great Sérac" is in the center

Photo, B. Washburn

What Are the Chances of Climbing Kangchenjunga?

NORMAN G. DYHRENFURTH

Kangchenjunga has always held for me a fascination that cannot be put into words. Although I have not been there, I have studied most of the available literature on the subject, and have talked at great length with such men as Schneider, Hoerlin, Wieland, and my father, men who have lived and fought in the shadow of that great mountain.

NO MOUNTAIN on the face of the earth can surpass Kangchenjunga for size, magnificence and awe-inspiring grandeur. Although third of the world's mountains in height (28,146 ft.), it has perhaps attracted the attention of more tourists, scientists and mountaineers than any other peak in the Himalayan Range. One obvious reason for so much interest is the fact that it can be seen from Darjeeling; and, from a mountaineer's point of view, it is important that one can approach Kangchenjunga without getting permission from the Dalai Lama in Lhasa, since it lies on the border of Nepal and Sikkim. Nowhere on the way does an expedition have to cross into forbidden Tibet.

Before discussing a possible route to the highest of its five summits, I will briefly mention the expeditions that have made serious attempts to climb the mountain:

1905: The first attempt was led by A. E. Crowley, an Irish newspaperman. Other members were R. De Righi, an Italian, and three Swiss, Dr. Jules Jacot-Guillarmod, Alexis A. Pache and Charles A. Reymond.

They attacked the mountain from the Yalung Glacier, over its Southwest Face. After reaching a height of about 20,650 feet, one of the porters deserted and fell to his death. A few days later a huge avalanche crushed Alexis Pache and three native porters between Camps 6 and 7. This was proof to the natives of Sikkim and Nepal that "the God of Kangchenjunga does not permit anyone to approach his holy throne."

1920: In the fall of the year, Harold Raeburn and C. G. Crawford tried the same Southwest Face of the mountain, only to be forced back by avalanche danger at an altitude of somewhat over 20,000 feet.

JANNU (25,288 FEET)
The rock ridge in left middle ground is the beginning of the Northwest Spur leading to Kangbachen Peak

KANGCHENJUNGA
Seen from the Base Camp of the International Himalayan Expedition, 1930
Photos, G. O. Dyhrenfurth

1929: This was the first formidable attack, led by the German, Paul Bauer. It was a large modern expedition, consisting of nine extremely capable Bavarian climbers. Their base of operations was the Zemu Glacier on the eastern ramparts of Kangchenjunga, and the East Spur was chosen as presenting the best chance for success. This spur, called "Ostsporn" by the Germans, is a snow and ice ridge which culminates in a peak designated as Peak 7700 (25,256 ft.), and continues on up to the North-Northeast Ridge of the mountain. The East Spur far surpasses in difficulty and length anything that can be found among ice ridges in the Alps. After about a month of the most difficult type of ice climbing, it was made sufficiently safe for porters to carry their loads up to the numerous high camps. Camp 10 was established on October 2nd at an altitude of 23,025 feet, just above the famous ice gendarmes of the spur. Next day the Bavarians reconnoitered up to 24,272 feet, thinking that the worst was behind them, but Kangchenjunga had not yet begun to fight. Five solid days of snowstorm, in which more than seven feet of fresh snow fell, nearly led to a catastrophe, but with almost superhuman effort a successful retreat was effected.

1929: That same year a young American, E. F. Farmer, attempted the Southwest Face alone. Leaving his three porters behind at a camp on Yalung Glacier, he started an ascent in a westerly direction below the Talung Saddle. He has never been seen again.

1930: A large Swiss-organized expedition under the leadership of Dr. G. O. Dyhrenfurth and Mrs. Hettie Dyhrenfurth* was determined to have a close look at Kangchenjunga. It was an international group, comprising some of the best climbers of Switzerland, Germany, Austria, and England, including Frank S. Smythe, who in later years won fame on Kamet and Everest.

Dr. Dyhrenfurth's original plan was to attempt the mountain over the East Spur, but later he decided to try it from the northwest. This plan had its origin in D. W. Freshfield's projected route, which led to the col between the Twins and Kangchenjunga from the Kangchenjunga Glacier. According to his calculations, there would be no danger from avalanches on this route, but they would fall instead in the great cirque to the right.

The expedition established a Base Camp at Pangpema, and several high camps on the upper Kangchenjunga Glacier, the high-

* The author's father and mother.—*Ed.*

est one at 19,450 feet. From there, a careful study of Freshfield's proposal proved that a direct route to the "North Col" (22,615 ft.) between the Twins (24,108 ft.) and Kangchenjunga was practically impossible. It was therefore decided to try to reach the North-Northeast Ridge slightly south of the "North Col." The primary obstacle was the first of a series of three huge ice terraces, which form part of the mountain's armor on the north. After weeks of extremely difficult ice climbing, involving all manner of rope-pulleys, ice-pitons and the like, Erwin Schneider reached the top of the great ice wall at about 20,992 feet. The approach to the North Northeast Ridge seemed to be assured, but the inscrutable Kangchenjunga had other plans: a huge ice avalanche swept down its North Face, killing one porter. Miraculously, the rest of the climbers escaped.

After giving up the Freshfield Route, the 1930 expedition made a thorough investigation of the Northwest Spur. The plan was to try to reach Kangbachen Peak (25,774 ft.), Kangchenjunga's fifth summit. From there it should have been possible to reach the long West Ridge of the mountain. But that route, too, had to be abandoned at an altitude of about 21,000 feet. The Northwest Spur proved to be extremely difficult and exposed. It was the sort of rock climbing that might be possible in the Alps or in the Rockies, but quite out of the question at that altitude. Reluctantly, the men gave up their primary objective, and turned towards Jongsong Peak and other "seven-thousanders."

1931: The second German expedition, again under the leadership of Paul Bauer, consisted of ten top-notch climbers, most of them from Munich. Once more the battle was waged from Zemu Glacier over the East Spur, this time during the latter part of the summer. With the monsoon still dominating the atmosphere, they expected good, steady autumn weather for the final attack on the summit pyramid. However, weather and snow conditions were extremely unfavorable that year; almost two months were needed to make the nightmarish ice ridge passable. Tunnels through the bulging ice towers had to be dug, and most of the camps consisted of man-made ice caves, since there was no place for tents. There were heart-breaking mishaps: two "tigers," one of them Sirdar Lobsang, of Everest fame, fell sick and died. The climbers suffered two cases of appendicitis, rheumatism, heart attack due to overexertion and frostbite. Hermann Schaller and Pasang, one of the Sherpas, fell to their death. Time and again the route had to be improved, changed,

and in part renewed. It was an almost uninterrupted chain of hard luck and catastrophes.

Finally, on September 17th and 18th, the Bavarians stood on the highest point of the East Spur (25,256 ft.), far above the "last difficulties" of 1929. But a great disappointment was in store, for the East Spur does not simply meet the Northern Shoulder of Kangchenjunga, but between the spur summit and the Sugar Loaf (25,502 ft.) of the main ridge (N.N.E.) there lies a saddle about 250 feet deep. The opposite slope leading up to the Sugar Loaf is therefore about 500 feet high, convex, and very steep. At that time there was every sign of imminent avalanche danger, and no other way to reach the main ridge. Therefore the desperately disappointed men had to admit defeat. An orderly retreat down that horrible ridge was in itself a great accomplishment. And so the second German Kangchenjunga Expedition ended in failure, after great sacrifices and unparalleled hardships.

1931 was the last year of a serious attempt on Kangchenjunga, though there have been several smaller undertakings which have tried to reconnoiter other routes of attack on the mountain:

1933: During the Houston-Mount Everest flight expedition, Kangchenjunga was circled by plane, but unfortunately the weather conditions were not very favorable for photographic purposes. Still, several interesting and helpful pictures were made on this flight.

1936: Again Paul Bauer led a German expedition through Sikkim, planning to make a stab at the northern summit of the Twins (22,976 ft.) by its East Ridge. The unusually heavy monsoon snows forced his party to retreat after they had reached a height of 21,000 feet.

1937: A small German expedition, consisting of the Swiss, Ernst Grob, and two Germans, L. Schmaderer and H. Paidar, made another attempt on the Twins' East Ridge, but fared even worse than the previous year's party.

If a safe and not too difficult traverse from the northern to the main summit of the Twins (24,108 ft.) exists, one might be able to reach the "North Col" and thereby the North-Northeast Ridge of Kangchenjunga. This "North Col" is of great strategic importance; in fact the 1930 Expedition had originally planned to reach it from the Nepalese side. It is therefore of special interest that in the fall of 1937 a small British expedition, consisting of C. R. Cooke, J. Hunt and Mrs. Hunt, attempted the col from the Sikkim Side. Cooke,

who had previously climbed Kabru, together with two of the best "tigers," made a determined effort to reach the col from the Twins Glacier. The ascent was extremely difficult in stretches, and the party was in acute danger from falling rocks; but, contrary to expectations, the route did not appear impossible. They pushed on to a height of 21,650 feet, slightly less than a thousand feet below the col, before returning to camp.

1939: This year Grob, Schmaderer and Paidar were active in the shadow of Kangchenjunga. After having climbed the proud Tent Peak (24,150 ft.), they intended to have another try at the Twins by way of the East Ridge, but an early monsoon ruined any further climbing plans. This particular problem still remains unsolved.

Such is the story to date. The jealous god of Kangchenjunga has been consistent in his revenge upon intruders. Eleven men have died. A score of Europe's best climbers have been defeated. The challenge remains: is Kangchenjunga climbable?

In 1931 Dr. Dyhrenfurth wrote: "It looks very much as if Kangchenjunga is indeed above the limitations of strength and will power of the present-day generation of mountaineers." Little has happened since then to warrant any optimistic views about a successful ascent.

Of all the high mountains, Kangchenjunga is undoubtedly one of the most terrible. It appears to be more difficult than Mount Everest and more dangerous than K2. The huge mass of Kangchenjunga, measuring about ten miles from west to east, and about five miles from south to north, has some of the worst weather conditions and the heaviest precipitation of the entire Himalayan Range. Avalanches thunder down its walls. During a day in May 1930, 64 ice avalanches were counted on the North Face of Kangbachen Peak, averaging one every 13 minutes. Between 20,000 feet and 25,000 feet, Kangchenjunga is girded with a fearsome array of vertical or near-vertical cliffs. Even for "death or glory" climbers, the faces are practically out of the question. The ridges are exceedingly long and fantastically shaped; most of them are extremely difficult. This super-Alpine mountain has no known weak spots; indeed it embodies all the difficulties and dangers of mountaineering.

And yet, we can't give up so soon. Let us take a look at the various attempted and proposed routes:

1. The "Munich" Route by way of the East Spur:

Everybody is familiar with the extraordinary difficulties of this ridge. The worst feature is that it apparently takes two months to make it passable for porters with the necessary loads. Therefore the time before the monsoon is insufficient, and one must use some of the summer months with all their monsoon snow. This of course increases the dangers and difficulties considerably. If a strong team of competent climbers, in excellent physical condition, could establish Camp 12 in the saddle between the summit of the East Spur and the Sugar Loaf, at the beginning of the good weather period in autumn, then . . . the difficulties would not be at an end by a long shot, but at least a serious chance for success would exist. I have already mentioned the need for an effective way of dealing with the avalanche slope above the saddle. In reaching the Sugar Loaf, the climbers would find themselves on the North-Northeast Ridge of the main summit, at the beginning of a broad shoulder which finds its continuation in the third ice terrace of the North Face. The actual summit pyramid looks somewhat like the Matterhorn-head, and still holds several steep, probably quite difficult steps. There would be a definite need for at least one, perhaps even two more camps above Camp 12. According to Bauer's account, Camp 6, at the base of the East Spur (16,860 ft.), was considered the "Upper Base Camp." This means establishing seven or eight truly "high" camps, a very complex problem of organization.

2. "North Col" from Twins Glacier:

One might try to reach the "North Col" from the east (Sikkim), then proceed along the North Ridge (perhaps making partial use of the snow terrace east of the ridge), to the Sugar Loaf, then continue towards the summit pyramid as planned by Bauer. This route would be relatively short and in many ways ideal, but the approach to the col is technically difficult and under constant danger from falling rocks. Nevertheless the reconnaissance trip made by C. R. Cooke has shown that the much feared steep slope below the col is not as impossible as had previously been assumed. Whether the risks to be taken here would be greater than in the case of the never-ending East Spur with its grim gendarmes, séracs, and ceaseless exposure, is a question.

3. East Ridge of Twins:

One might ascend to the saddle (19,926 ft.) west of Sugar Loaf,

then climb along the East Ridge to the north summit of the Twins (22,976 ft.), continue to the main summit (24,108 ft.), and descend to the "North Col." From there on, one could proceed as in Route #2. The basic argument against this line of approach is the length of exposed ridges—most of them difficult—to be traversed (about 5½ miles), and several considerable drops and rises. The only reason for traversing the Twins would be to secure an approach to the "North Col" safe from ice avalanches and falling rocks. But since three efforts merely to reach the northern summit have failed in the past, the chances for success do not appear very bright. It may be possible to reach the Twins from the Nepalese side, according to observations made during the 1930 expedition. This might be easier from a technical standpoint, but it would present a complicated problem of organization. It would mean, for instance, establishing a base camp west of Nepal Gap, a very uncomfortable, remote base of operations.

4. West Ridge:

The lengthy West Ridge appears to be the easiest route. To reach the ridge from the upper Kangchenjunga Glacier by way of the Northwest Spur seems to be quite impossible, however, judging from the attempt of the 1930 expedition. Much more promising would be the following approach: up Ramthang Glacier to the saddle southeast of White Wave (22,828 ft.); along the Southwest Ridge of Kangbachen Peak to Kangbachen Peak (25,774 ft.); thence to Kangchenjunga West Peak (27,888 ft.) and Kangchenjunga's main summit (28,146 ft.). The slopes leading from Ramthang Glacier to the "White Wave Saddle" are somewhat threatened by ice avalanches. The ascent to Peak 7535 (24,715 ft.) appears to be very steep, but possible. The ensuing summit ridge, which forms the northern framework of the Yalung Glacier, measures no less than six miles from there to the main summit, with several drops and rises along its length. Another bad feature is its exposure to the almost constant western storms, but it does not seem to be difficult. For long stretches it looks almost like plain walking terrain, with plenty of space for a series of high camps. After the monsoon, during October and November, a well-organized and determined attack along that ridge might be successful. At least, it should be possible to reach Kangchenjunga West Peak. What the traverse from there to the main summit looks like has caused many guesses.

A major problem is political. The big Nepalese village of Khunza would have to be used to secure a base camp on Ramthang Glacier. Nepal is a closed country. Permission to enter is given only on rare occasions, and must be obtained from the Maharajah.

To be able to reach the Southwest Ridge of Kangbachen Peak from the south (Yalung Glacier) would mean a considerable shortening of the approach march and a great simplification of organizational problems. However, this possibility has not been sufficiently reconnoitered; what little is known about it is not very promising. The steep slopes enclosing the upper Yalung Glacier are considered to be among the most dangerous, for both Pache and Farmer were killed by avalanches not far from there.

5. Other Routes:

For the sake of completeness, one might mention the formidable East Ridge of the mountain, sweeping up from Zemu Gap (19,270 ft.) over the 25,518-foot peak to the South Peak (27,888 ft.). This seemingly endless, terribly jagged and corniced ridge is definitely out of the question as a sane route of attack. The same goes for the extremely steep South-Southwest Buttress, which swings up from Talung Saddle (22,124 ft.) towards the South Peak.

Among the mountain's tremendous faces, the southern front (towards Talung Glacier) and eastern front (towards Zemu Glacier) are beyond possibility; the northern (towards Kangchenjunga Glacier) and southwestern front (towards Yalung Glacier) are constantly swept by huge avalanches. All in all, the best route for Kangchenjunga is still an open question.

However, I should like to submit a few suggestions of my own:

A. Make a series of photographic flights around Kangchenjunga, paying particular attention to the Ramthang and Yalung approaches to the West Ridge.

B. If no safe way to reach the West Ridge can be found, make a strong bid for the "North Col" from the east, and continue along the North-Northeast Ridge.

C. Should a good route be discovered up to the West Ridge from either Ramthang or Yalung Glacier, plan definitely on attacking the mountain over that route.

Some time in the not-too-distant future, I hope to have the opportunity of testing my theories—on the mountain itself.

The Pressure Melting Point of Ice and the Excavation of Cirques and Valley Steps by Glaciers

JOEL E. FISHER

Recent studies[1] have developed a now well-established principle that outside the arctic the temperature of all glaciers 10 or 20 meters below the surface (and deeper) tends to be at all times at the local pressure melting point; that is, the temperature is continually very slightly below 0° Centigrade[2]. The upper 10 or 20 meters of ice, affected by colder winter temperatures, may cool down somewhat lower, seasonally, each winter.

This principle requires that the temperature at the very bed of any glacier, as one follows that bed up-glacier, shall gradually drop from exactly 0° Centigrade (at the snout) to temperatures fractionally *lower,* up-glacier, as the pressure of overlying ice and névé irregularly increases. This "pressure" is primarily that of the static load of vertically overlying ice and névé; but it may include some measure of the hydraulic head of the glacier upstream, because, under the extrusion flow processes of glaciers, the brittle surface ice, joining in with the rock walls and bed, provides a sort of pipe, within which the flowing ice behaves to a degree like a liquid, and therefore exerts a pressure (measured by its up-glacier head) in all directions, including vertically *downwards.*

The temperature of the bed ice, under 500 meters of overlying névé, alone with a static pressure of some 700 pounds per square inch, *must* evidently be lower than the temperature of any ice near the snout — else, if the temperature of the ice everywhere on its bed were exactly 0° Centigrade, melting would be greater, under the heavier pressure of thicker beds of ice, up-glacier than at the snout. Actually, the melting point of ice is lowered .0075° Centigrade per additional atmosphere of pressure.

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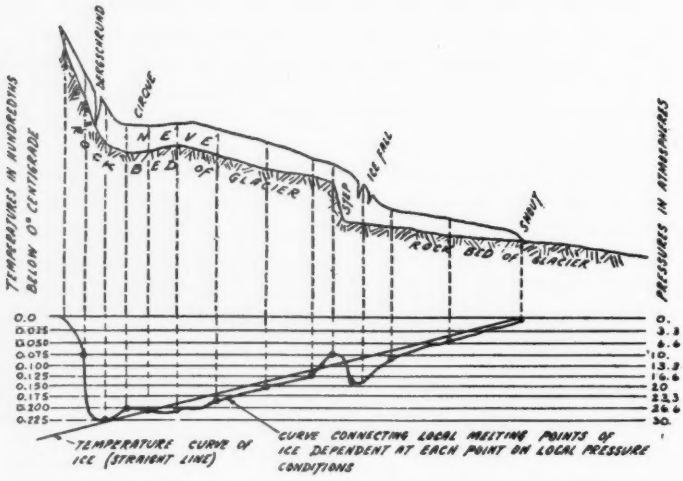
[1] T. P. Hughes and G. Seligman, "The temperature, melt water movement, and density increase in the *névé* of an Alpine glacier," Monthly Notices of the Royal Astronomical Society, Geophysical Supplement, IV (1939), 615-47 [Publication No. 2 of the Jungfraujoch Research Party, 1938].

[2] W. V. Lewis, "Formation of *Roches Moutonnées*: Comments on Dr. Carol's Article," *Journal of Glaciology,* I (1947), 60-63. See also G. Seligman, "The Structure of a Temperate Glacier," *Geographical Journal,* XCVII (1941), 295-317 [Publication No. 4 of the Jungfraujoch Research Party, 1938].



Successively colder temperatures below the surface up-glacier are altogether logical, as (except for localized precipitation) all glacier ice and névé derive originally from the snows falling above the bergschrunds, and the upper snows and ice originally possessed a temperature well below 0°, the year round.[3] Witness the aprons of ice, frozen solid to the surrounding walls of rock, above the bergschrunds on any hardy Alpine peak. Noontime melt water observed on such upper snowfields *above bergschrunds* is only a superficial surface feature and should not be viewed as indicative of temperatures, below the immediate surface, warm enough to permit melting. If this were more than superficial, the bergschrunds would close up! In fact, it is possible to say that bergschrunds mark the boundary between snow or ice whose temperature is *below* the pressure melting point (above the bergschrunds) and the névé or ice whose temperature[4] is at the local pressure melting point (below the bergschrunds). This tie-in of any bergschrunds with climatic alti-

[3] Hughes and Seligman, *op. cit.*, p. 631.

[4] This statement refers, of course, to the main body of névé, not to the superficial upper crust where temperatures during winter may fall below the pressure melting point.

tudes explains the much discussed "Cirque-Niveau" in any given district.

From these propositions, it is reasonable that the temperature of the ice (névé) on the bed of any glacier, *up close to the bergschrund,* must be just at the local pressure melting point[5]; but, because that very same ice (névé) was only very recently part of the upper regions of snows (above the bergschrund) which are definitely *below* their local pressure melting point, such névé has no past history of existence *at the pressure melting point.* It can not yet have accumulated, within its capillary passages, any *substantial* amount of melt water — no more than *just* enough to assure that its contact with the bed rock will be a moderately wet, lubricated contact as opposed to any frozen "adherence" to the rock, as is found above bergschrunds. Thus, any rocks held within that recently born névé ice will be held in a matrix which carries so little water within its voids as to minimize any retreat under pressure, within its own icy medium, of those tools which it carries, even though they may be held against the bed rock under the heavy pressure of the weight of thick overlying névé. (Attention is invited to the particularly greater thickness of overlying snow at the uppermost limits of any névé field, due to aprons of snow reaching steeply up the cirque slopes to the bergschrunds.)

Thus the temperature of the basal layer of névé, up close to the bergschrund, however heavy a static load it may carry, is *just* edging above the local pressure melting point; *just* able to provide a wet, lubricated bed; *just* able to cause the névé to yield, minutely, to pressure—not, however, sufficiently over the line of the pressure melting point to permit any rocks held in that *névé* to be pushed back readily into its icy medium. It will be recognized that the latent heat required for any minute local "melting" will always delay any quick transition from "hard" to "soft" ice, as a result of quickly increased pressure, so that for some time any ice, although under increasing pressure, it is still very hard rigid ice. There

[5] In the oft-reported classic exploration of a bergschrund on Mt. Lyell by the late W. D. Johnson, in which he told of water permeating its up-hill face, that water is to be thought of as merely surface melt water flooding down into the bergschrund from above, and not for a moment as water exuded from capillary passages within the bed of the supra-bergschrund ice slope, from regions 20 meters or more below its surface—regions therefore unaffected by surface air temperatures.

is thus a triple combination which exists only *immediately below the bergschrund:* (a) presence of vigorous cutting tools freshly fallen from the heights through the open bergschrund to the bed of the glaciers; (b) extreme static pressure thereon, which generates, right up at the foot of the headwall of a cirque, a particularly vigorous cutting action; (c) ice temperature *barely* reaching the local pressure melting point and therefore holding such tools in an extremely firm grip against the bed. It is this triple combination which is responsible for the excavation of cirques; and of these three factors it is the third, the relationship of ice temperature to local pressure melting point, which is a feature unique to the physics of glaciers. Against these three factors, velocity of motion is insignificant, provided only that there is *some* motion. We are too prone to impute to faster motion of ice a correspondingly faster supply of cutting tools. That is not so. The number of cutting edges carried across the bed by a glacier depends altogether on the rate of supply of cutting tools, not on the velocity of the glacier itself.

Consider next what changes occur in the characteristics of the ice as it ages and moves downstream from the cirque wall. Except for a thin veneer of surface ice, the glacier can never become any colder, for winter temperatures do not penetrate below 20 meters and mean summer temperatures are well above freezing. On the other hand, the ice can pick up some heat by conduction from melt water seeping down and (very slowly) from bed rocks which conduct heat from within the earth, and also by friction. If heat from these sources is insufficient to warm the ice enough to keep pace with a rising pressure melting point (rising because of the gradual reduction in pressures as the ice thins out down-valley), then flowage slows down, erosion of the bed increases, and the névé reaccumulates deeper and deeper until its thickness is again sufficient to build up a static pressure to place it once again on the warm side of the curve of pressure melting points. Once this equilibrium is regained, the ice in the glacier's bed will begin to accumulate ever so little more water in its capillaries and to accumulate heat sufficient to place it a little further over the equilibrium of local pressure melting points. When this begins to happen, while the ice is still far from any spongy, cheesy condition, it no longer has *quite* the vise-like characteristics that it formerly had; the cutting tools in its bed no longer are *quite* so insistent on gouging out the bed rock; and,

also, those glacier-worn cutting tools are no longer so sharp. Here, then, in this slight relaxation of pristine erosional vigor, we can see just how the downstream lips of alpine tarns are first induced into existence.[6]

This very same process may repeat itself any place farther down the glacier's course, wherever initiated by a steep drop in the grade of the bed (due, perhaps, originally to structure). Against the back wall of such an incipient step, the same three factors thus exist which accounted for cirque excavation — or for tarn excavation: unworn cutting tools (derived now from the back wall of the step itself), locally increased static pressure of ice on its bed, and (to a lesser degree, but still there) temperatures of ice colder locally than the local pressure melting point.

It will be noted that a rise in the pressure melting point occurs first at the top of the step. This ice, now hardened, as it goes over the step, is soon subjected to greater static pressure; but this greater static pressure can not instantly resoften the ice because the latent heat absorbed in minute local melting operations creates a lag. Pressure can thus rejuvenate cutting power — appearing as excavation at the foot of the step, just as at the headwall of a cirque. Eventually, this greater pressure overcomes this lag in softening the physical state of the ice: the ice softens again, and the extreme vigor of its erosion ends once more.

In short, while *temperature* of the ice near the bed of a glacier follows a nearly straight line graph, rising slowly as one goes down-glacier, *pressure* at selected points may vary greatly, depending on special local conditions. The temperature of any particular portion of the ice will therefore vary, often quite quickly, from one side of the curve of equilibrium of pressure melting points to the other, with resulting changes in the "state" of the ice and in the cutting power of tools embedded therein, as the glacier moves through regions of varying pressures.

The processes of cirque excavation, of tarn excavation and of step cutting by glaciers, with their apparent anomalies of reverse slopes persisting in profiles, are thus seen to stem from the irregular curve of the local pressure melting point of the ice, locally super-

[6] The reader at this point is referred to the interesting studies of Hans Carol. See "The Formation of *Roches Moutonnées*," *Journal of Glaciology*, I (1947), 57-59.

imposed on a more nearly straight line gradual rise in the temperature of the bed ice, the latter starting from a temperature definitely below any possible pressure melting point (above the bergschrund) and rising all the way to a point (at the snout) which is exactly *the* pressure melting point of ice at atmospheric pressure.

PROCEEDINGS OF THE CLUB

Year 1947 (7 December 1946 to 6 December 1947)

The past year has seen so much activity in our Club that it is difficult to know how fully to report about it.

Since the Annual Meeting on 7 December 1946, four meetings of the Board of Directors have been held: in Cambridge on March 29th, in New York on January 6th and October 4th, and in Boston on December 6th. During this period the Club has had a gain of eight in membership, for we have elected eleven candidates and lost only three members through death and resignation.*

The most interesting event has been the move of the Club Headquarters in New York from 46th Street to 90th Street. This has required endless time and attention from the officers residing in and about New York City. The move is now completed; but, as you will learn from reports of others closer to the scene, there is still much work to be done before the new rooms will be in order. Another important event was the organization of the Sierra Nevada Section of our Club in San Francisco. Several meetings have been held there; officers have been elected, and the Secretary of the Section keeps us well posted concerning our offspring's activities. Like most children, ours, I suspect, considers its parent a bit slow; and we, in turn, like most parents, are obviously going to wonder at our offspring's growth and energy.

Well-attended informal meetings of Club members were held last spring in Cambridge and in Philadelphia. During the year, in addition to the two fine issues of the *Journal,* members have had mailed to them a revised membership list, material from our Conservation Committee, and an outstanding paper on "Belaying the Leader," reprinted from the *Sierra Club Bulletin,* as well as routine notices and reports from the Secretary and the Treasurer. Perhaps the two most notable mountaineering expeditions in which members participated were Bradford Washburn's "Operation White Tower" on Mount McKinley and the Hall-Smythe-Odell-Gibson exploration of the Lloyd George Range. The Kauffmans' first ascent of Mount Butters and other peaks in the Battle Range, and the 23

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* Membership changes: resigned, 1; dropped, 1; deceased, 1 (William Williams, 8 February 1947); elected, 11. Current membership: 326.

first ascents made by the Harvard Mountaineering Club party in the Coast Range, under W. L. Putnam's leadership, were also most noteworthy accomplishments. Other members were climbing in the Coast Range, the Sierras, the Canadian Rockies, the Selkirks, the Tetons and other more or less accessible mountain areas.

In short, the Club has enjoyed an active and prosperous year.

BRADLEY B. GILMAN,
Secretary

ANNUAL MEETING AND DINNER

The 45th Annual Meeting of the Club was held at the Appalachian Mountain Club, 5 Joy Street, Boston, Massachusetts, on Saturday, 6 December 1947, at 2.00 P.M. President Wood presided. At the start of the Meeting 29 members were present; after a few minutes there were 32; and before the close of the Meeting several more members and a few guests joined the group.

The reading of the Minutes of the previous Annual Meeting was waived.

The Secretary read his Annual Report. It was voted to accept it and place it on file.

The Treasurer presented his Report for the fiscal year ending 31 October 1947. It was voted to accept it and place it on file.

The Librarian read her Report and, in addition, commented informally on the acquisition of books from the William Williams Estate and of exhibits from Dr. Thorington. She stated that there were now over 4,385 books in the Library, not counting duplicates.

Bates and Robertson reported on publications, stating that two issues of the *Journal* had been distributed in 1947 and that material was on hand for 1948. They hope to publish two issues in 1948, although rising costs may curtail their somewhat ambitious program. The Editors emphasized the necessity for limiting the length of articles. They indicated their wish to continue reports under "Various Notes" of activities in regional groups and college mountaineering organizations. Here again, space is a problem.

House reported for the Conservation Committee, on which Field and Baldwin served, that the proposed Federal legislation concerning the Olympic Peninsula is still in the hands of a Congres-

sional subcommittee, and that vigorous action is being taken to check further inroads on the forest lands. There was some discussion from the floor, led by Henderson and Bonney, concerning the pending Federal bill to sell grazing lands in the Jackson Hole region to ranchers who now lease them. House made it evident that the Club was prepared to take a stand on this legislation at the appropriate time.

Houston reported that the Expedition Committee was organized and ready to welcome all inquiries within its field of activity as outlined in the previously published vote organizing the Committee.

The Nominating Committee, composed of Thorington, Fisher and Case (Chairman), nominated the following Councillors:

For term expiring in 1949: W. B. Osgood Field, Jr.

For term expiring in 1950: William R. Hainsworth
William P. House
M. Beckett Howorth

On motion duly made and seconded, it was voted to close the nominations; and the Secretary was instructed to cast one ballot for the slate nominated by the Committee. This was done, and the Chair announced the election of the Councillors whose names had been presented.

President Wood commented on the Club's activity in the field of guiding. He stated that the National Guide Committee had been reestablished after the receipt of recommendations, especially from the Cascade Section of the Club. He stated that Bates had agreed to act as Chairman of the Committee. There followed active discussion from the floor concerning the procedure which would be established for certification of guides at various climbing centers. Henderson, Bonney, Whitney, Case, Miss Hurd and Mrs. Orcutt participated.

President Wood stated with respect to the new Club House that the Club had now exceeded the $35,000 requirement set in Dr. Ladd's offer. Photographs of the new Club House, exterior and interior, at 113 East 90th Street, were shown to the members. There was discussion of the very material improvements which Dr. Ladd has made in the building since offering it to the Club. Miss Buck showed a floor plan of the building and stated that all Club property had now been moved to 90th Street. There was some discussion about arrangement of quarters at the Club House for out-of-town

members. This would involve improvement of the stable property in the rear and can not be expected in the immediate future. Present plans call for establishment of the Library on the second floor, with a small lounge and map room. The ground floor is needed for a large lounge and a reading room. It was stated that the telephone is in working order and that a caretaker, Mr. Neil, is there at most times. Members may therefore see the rooms and use them at all convenient hours. President Wood stated that in the next few weeks all members would be given a chance to contribute to the Endowment Fund for the Club House. An especial effort will be made to secure some support for it from the entire membership.

The Safety Committee, composed of Miller, Howorth, Robertson and House (Chairman), presented a lengthy written report which was elaborated on by House, who made a general statement. He commented on Miller's trip to the West Coast and his interviews with witnesses who had been involved in some of the 1947 mountaineering accidents. Miller read a sample portion of the report dealing with the accident on Cathedral Spires and then outlined in detail a Club program of accident prevention recommended by the Committee. This would include (1) publishing material in the *Journal,* (2) gathering data concerning mountaineering accidents, (3) working through local groups and sections on a national educational campaign, (4) devoting a considerable part of the second 1948 *Journal* to material on the prevention of accidents, (5) issuing additional literature to educate the non-climbing public in safety measures, (6) preparing a safety code to be adopted by the various climbing groups, (7) furthering cooperation between the Guide Committee and the United States Forest Service to promote accident prevention by leaders of climbing parties, and (8) awarding a safety emblem each year to a group or individual distinguished as having contributed most to the prevention of accidents. A lively discussion ensued, with Henderson, Howorth, Houston, Fritz, Miss Hurd and Mrs. Orcutt participating. It was suggested that the Committee include in its program the education of the public with respect to distress signals.

Miss Buck moved, and after seconding it was voted, that the Secretary write on behalf of the Club to Frank Waterman, who had been confined to his home with a serious illness for some months,

and send him the best wishes and sympathy of the Club members.

After discussion of the method of electing Directors, it was suggested from the floor that it would be an improvement to have the Nominating Committee's Report forwarded to Club members in advance of the Meeting. Hall suggested that the names of the Nominating Committee be circulated to members well in advance.

There was some discussion of the rotation of Annual Meetings to include New York, Boston and Philadelphia; and the Secretary was urged to give members at least a month's notice in advance of the dates of Meetings. Bonney suggested that perhaps a meeting could be arranged in the West during the climbing season.

The Meeting was adjourned at 4.15 P.M.

Miller then showed slides of a number of Alaskan glaciers and gave a short talk about his 1947 glacier studies in that area.

The Annual Dinner was held the same evening at 46 Beacon Street, Boston, at 7.00 P.M. There were 93 present, including 44 members. President Wood welcomed the diners, particularly our member from distant Texas and several members of the recently reorganized Yale Mountaineering Club who were present as guests. The Secretary was instructed to send a wire to the Sierra Club, which was having its annual meeting in San Francisco on the same evening—

> ON THE OCCASION OF THIS, OUR SIMULTANEOUS ANNUAL MEETING, THE AMERICAN ALPINE CLUB SENDS ALL MEMBERS OF THE SIERRA CLUB OUR SINCERE BEST WISHES—

and to cable the Alpine Club as follows:

> AT OUR ANNUAL DINNER THE THOUGHTS OF US ARE WITH ALL MEMBERS OF THE ALPINE CLUB

After the close of the dinner, President Wood showed motion pictures newly released by the Government of his reconnaissance flights over the North Pole and mountain areas of Ellesmere Land. Mr. Hall followed with a beautifully illustrated account of his exploration and first ascents in the Lloyd George Mountains of British Columbia last summer. The Kodachrome slides by John Ross, President of the Harvard Mountaineering Club and a member

of the expedition, elicited much appreciative comment from the audience.

The program ended at 11.00 P.M.

BRADLEY B. GILMAN,
Secretary

CONSOLIDATED TREASURER'S STATEMENT
1 November 1946 to 31 October 1947

Receipts:		
Dues:		
1 Life Membership (Cr. Reserve Fund)	$ 200.00	
17 @ $15	255.00	
209 @ 10	2,090.00	
51 @ 5	255.00	$ 2,800.00
Dividends and Interest (Cr. $150 Publications Fund)		962.10
Royalties		129.06
Sales:		
A.A.J. (Cr. Publications Fund)	$ 387.17	
Guide Books (Cr. Publications Fund)	157.85	
Purcells Book	30.00	
Equipment	1,070.92	1,645.94
Donations:		
A.C.C. Hut Fund	$ 200.00	
Publications Fund	2,000.00	
New House Fund	35,325.00	
Unrestricted	25.00	37,550.00
		$43,087.10
Disbursements:		
Rooms		$ 1,808.37
Library		782.63
Dinner (net cost)		105.13
Publications:		
A.A.J., 1947 (two numbers)	$ 2,399.89	
Year Book	323.13	
Interior Ranges Guide (Dr. Publications Fund)	860.08	3,583.10
Donation: A.C.C. Hut Fund		200.00
Equipment purchased (30 parachutes)		345.00
Investment: 5M Liggett & Myers 5s '51 (Dr. New House Fund)		5,851.66
Moving expenses (Dr. New House Fund):		
2 months' rent	$ 266.68	
Supplies	22.50	289.18
Miscellaneous		682.02
		$13,647.09
Cash Balance, 1 November 1946		$ 1,985.71
Add excess Receipts/Disbursements, 1947		29,440.01
Cash Balance, 31 October 1947		$31,425.72

JOEL E. FISHER,
Treasurer

REPORT OF THE LIBRARIAN

1 November 1946 to 1 December 1947

The Library was at last moved in late November 1947, after many trials and tribulations, to its new quarters on the second floor of the remodelled fire house, 113 East 90th Street. If you have read *Mr. Blanding Builds his Dream House,* you will understand and appreciate the difficulties involved, and our struggles with carpenters, electricians, floor men, painters and movers.

Although all the contents of the Library have now been transferred to 90th Street, only the furniture, at this date, has been carried or hoisted to the second floor. On the first floor there still remain 160 large, heavy cartons of books, 90 pamphlet boxes, 130 framed pictures of all sizes, and innumerable packages. Before all these can be unpacked and properly placed, the old open-shelf cases, newly backed, must be set up, and many minor details attended to, and the final painting completed. We are using a soft, light, neutral green for the walls, and a slightly darker shade of green for the trim and the open-shelf cases. The metal ceiling has been painted just off a dead white.

The length of the second floor is about 57 feet. Fifteen feet from the south end on 90th Street, a partition cuts off a space which formerly served as the office of the fire chief. In this room we have placed cases for rare and autographed books, a case for new donations (to avoid cluttering up the main reading room), filing cases and a large storage case. A work table and desk will be added later. Adjacent to the room are a toilet, a shower (to be used as a broom closet) and a large revamped closet.

The main room is 42 feet in length. From the partition to the far side of the entrance door, it is 19½ feet wide. The widest part —23 feet—is near the north windows. This section faces a small court, is quiet and has very good daylight. This end has been reserved for a reading lounge, similar in arrangement to our former one, with journals in sectional bookcases on either side of the long maple table.

Twenty new open bookcases, arranged as stacks, in two double rows, occupy the center and separate the lounge from a section containing map and photograph cases, pamphlet boxes and magazine racks, and a large, bulky case for folios. An additional long table

here will give members an opportunity to study the maps and photographs without disturbing readers at the other end of the room.

Adequate lighting has been a problem. After numerous consultations with an expert advisor from the General Electric Company, we have had installed ten fluorescent fixtures. For the first time since our Club rooms came into existence in 1929, we have satisfactory lighting.

The expense of moving has been greatly reduced by voluntary aid in packing the books. The Club owes much to Messrs. Burdsall, Burton, Kothe, MacInnes, Mills, Ullman, Walsh and Wolcott, and especially to our valiant Mr. Estoppey, who never missed a packing bee, and to Mr. Field, Jr., for several trips with his station wagon and for his unlimited patience and untiring efforts in accomplishing the gigantic task. We are greatly indebted to Dr. Ladd for facilitating in every way the move into the new quarters and to his caretaker, Mr. Neil, for his kindly assistance and cooperation. Certainly we should not forget our Treasurer, Mr. Fisher, who must be suffering severe headaches as the bills pour in. Last, but not least, the Librarian herself, casting all modesty to the winds, claims credit, too, for an incredible amount of time and labor spent in planning and supervising the new setup.

Limited space prevents me from stating in detail the varied gifts of the year. Here I can only thank all contributors most heartily for their donations, which include many items of unusual interest.

We shall all rejoice in the feeling of airiness, spaciousness and light which pervades our new quarters. We shall take delight in the excellent ventilation, due to the long windows and the 12-foot ceiling. It will take some time yet to be fully settled, but we hope to welcome you to the new Club Headquarters early in 1948.

HELEN I. BUCK,
Librarian

REPORT ON THE RESEARCH FUND

1 November 1946 to 31 October 1947

Balance, 1 November 1946	$ 455.86	
Receipts:		
Sales: *Bibliography of American Mountain Ascents*	47.80	
Contributions	2,581.30	$3,084.96
Disbursements:		
Grant to Maynard M. Miller for Alaskan glacier surveys	$ 100.00	
Minimum thermometers placed on Mount McKinley by Bradford Washburn	25.50	
On account, Forbes dirt band experiment in Alps	1,959.10	
Reserved for publication of Palisade Glacier map, based on survey by Weldon F. Heald	100.00	2,184.60
Balance, 31 October 1947		$ 900.36
Deposited in Chase National Bank of New York	$ 503.16	
Deposited in Crédit Suisse, Zürich	397.20	
	$ 900.36	

The Fund made a grant of $100.00 to Maynard Miller toward his aeronautic survey of Alaskan glaciers and has earmarked another $100.00 for the production of an outstanding map of the Palisade Glacier in the Sierras, based on the survey made by Weldon F. Heald under a previous grant. It is expected that this map will be ready early in 1948. One feature is that it will be printed on special new water-resisting paper. The Fund also purchased minimum thermometers which have been attached to the upper rocks of Mount McKinley by Bradford Washburn.

Last year's report carried a short notice of certain experiments being started on the Trift Glacier (Gotthardmassif) and the Glacier du Géant, under the direction of Joel E. Fisher, with the object of determining the process by which Forbes dirt bands originate on glaciers.* These experiments were continued last year; and the cost, necessarily considerable when the work is carried on at a distance, has been included in the statement of the Research Fund.

* *A. A. J.*, VI (1947), 328-32. A fuller discussion, with credit to the Research Fund, appeared in the *American Journal of Science*, 245:137-45, March 1947.

Contributions from those interested have been sufficient to offset the entire cost of the experiments and, in addition, to provide additional money for checks on progress in the future.

JOEL E. FISHER

BOOK REVIEWS

Mountain Climbing Guide to the Grand Tetons, by Henry Coulter and Merrill F. McLane. 66 pages, with a map and 13 sketches. Hanover, N. H.: Dartmouth Mountaineering Club, 1947. $2.00.

Since the publication of Fritiof Fryxell's excellent work on the Tetons in 1932, a real need has arisen for an up-to-date mountain guide booklet giving accounts of the many new routes developed in the Tetons during subsequent years and a description of climbing conditions in the area. The vast increase of mountaineering and the immense popularity of the Tetons make this new pocket-sized guide very appropriate. Its description of the range and of general conditions there, and its suggestions concerning equipment and precautions, will be of interest and value both to those planning a first visit and to those who have been there before. The discussions of individual peaks and descriptions of the major routes are likewise of real interest and should materially help parties to find their own way. Of especial value are the route sketches, which are well done and add to the utility of the book. Of value, too, are the bibliographies of all routes described, giving data which, in most cases, will make available to those really interested the detailed information needed on the more difficult routes.

The authors state in their introduction that they have not attempted to describe every route nor to emulate the detailed descriptions of European guidebooks. This point could have been given greater emphasis, for some readers unfamiliar with the Tetons or unskilled in the art of route-finding might rely too heavily on the descriptions and regard them, despite the authors' explanation, as foolproof tickets to the summits. Climbers who are familiar with some of the routes will perceive that the descriptions are extremely general, providing rough directions only; they will remember that sound mountaineering experience and route-finding ability are still essential. So long as readers recognize these limitations, this guidebook should prove a valuable aid to climbing in the Tetons.

The authors are much to be congratulated. It is to be hoped that their booklet will inspire similar publications about other major climbing areas in the country.

W. P. House

Picture Maker of the Old West: William H. Jackson, by Clarence S. Jackson. 303 pages, with 393 illustrations. New York: Charles Scribner's Sons, 1947. $7.50.

Anyone with an eye for pictures and a love of the great open spaces should enjoy this book about the early life of William H. Jackson, well-known pioneer photographer of the Hayden surveys. Between 1870 and 1880 Jackson and his camera visited the wildest and most beautiful of the western mountain country, from the Yellowstone to the Tetons and Wind Rivers, thence southward through the Sawatch, Elk and San Juan ranges of Colorado to the Mesa Verde and the pueblo towns of New Mexico. Primarily noted as a cameraman, Jackson was quite a hand with brush and pencil as well, as some delightful paintings and sketches show. A colored reproduction or two, one feels, would have added to the book's effectiveness. Still, the picture record of Jackson's historic journeys is always intensely interesting and often beautiful and moving. Many of the photographs have become justly famous; the first views of the Yellowstone, for instance, and the familiar shot of the Mount of the Holy Cross. These are all the more impressive when one considers the formidable difficulties faced by the photographer of that day, with his big box camera, collodion wet-plates and cumbersome darkroom equipment that had to be taken along.

Clarence S. Jackson, son of the artist, assembled the illustrations; and his pen supplied the sympathetic narrative that accompanies them.

ELIZABETH COWLES

When Men and Mountains Meet, by H. W. Tilman, D.S.O., M.C. 226 pages, with six maps and 54 illustrations. Cambridge University Press; New York: The Macmillan Company, 1947. $3.50.

Mr. Tilman is one of the "irreconcilables" of mountaineering, apparently preferring to do everything the hard, or at least the unusual, way. Although he emphatically denies that the companion line to the title of his current book applies to any of his own adventures, the reader will be inclined to disagree with him, particularly with regard to the explorations in Assam (made before the War) which are described in the first section of the book. His accounts of partisan warfare in Italy and Albania, where he was dropped behind enemy lines on several occasions, are engrossing and enter-

taining, perhaps the more so because he does not pretend to be "global" or authoritative but describes his own adventures with a dry wit and objective humor which apparently never failed. Wherever he went, Mr. Tilman found peaks to climb and obstacles to surmount; some of his companions were odd, his adventures often comic and sometimes desperate; but his light touch is always there. The ten years which Mr. Tilman spent in Kenya, reputedly reading twice through the huge Everyman's Library, have given him an inexhaustible supply of quotations, metaphors and parallels which brighten his writing like stars in the night sky. His understatement is sometimes so monstrous that the reader must look sharp to appreciate the magnitude of his exploits. This book is a welcome addition to a mountaineering library, though the reader may neither wish nor be able to repeat Mr. Tilman's adventures.

C. S. Houston

Mountains and Men, by Wilfrid Noyce. 160 pages, with four maps and 17 illustrations. London: Geoffrey Bles, 1947. 18/-.

Ten years ago, when Wilfrid Noyce was an undergraduate at King's and the editor of *Cambridge Mountaineering, 1938,* he was already known for his brilliance. He had achieved remarkable feats on the rocks of Wales and the Lake District; he had "finished" Tryfan, with J. M. Edwards, for the Climbers' Club guidebook; and he had made, over several seasons, impressive ascents on divers great ridges of the Oberland and Valais. In the intervening years, which evidently have brought no diminution of the brilliance or the love of hills long familiar, he has been farther afield, to Garhwal and Kashmir and Sikkim; and now he is editor of the *Himalayan Journal* and author of a delightful volume of reminiscences entitled *Mountains and Men.*

The author's preface modestly asserts that only one claim can be made for this book—"that it adds a little, a very little, to that tradition of very personal sentiment to which a line of great writers has left us heirs." As if in conversation with a thoughtful man, inclined to talk a little bookishly, one listens to recollections and reflections: the nature of the climber, the "anatomy of pleasure," the experience of falling. The author has suppressed, not infrequently, what he may consider barren detail. Books and journals and maps that helped to counteract his reticences soon hemmed in this reviewer's chair. The collateral searchings—need one say?—

were pleasant, too; and the happy impression left by *Mountains and Men* was, if anything, heightened. One comes with a sense that the right sort of person was there to the entry in "Sikkim Diary" for September 24th:* "Again what luck, to have climbed Pauhunri, 23,385 feet, and just over a fortnight after leaving Delhi. But really amusingly unorthodox."

D. A. Robertson, Jr.

Mountain Prospect, by Scott Russell. 248 pages, with seven sketch maps and 46 illustrations. London: Chatto and Windus, 1946. 18/-.

Scott Russell was a prisoner of war in Singapore for three and a half years. It was during this time—when, as he says, the present and the future were alike blank—that this refreshing book of mountain adventure first saw the light. Russell, because of his scientific knowledge of plants, was put in charge of the gardens where men worked to provide the all too meagre rations of the prisoners. He persuaded the Japanese to give him paper to make lists of plants and in this way was able to keep two copies of the book going, in case one should be discovered and confiscated.

Not a sign of the conditions under which it was written appears in this delightful account of mountain adventure, which ranges from unexplored valleys of New Zealand to the snows of the Karakorams, and is illustrated by excellent photographs. Here was a lucky boy: he had all the thrill of discovering a new world at his very door in the untrodden valleys and peaks, the interesting vegetation of New Zealand—all within a scale where it was possible for him to forge his own mountain experience with his chosen companions. As a reader, I felt genuinely sorry when Scott Russell left this most fascinating mountain world for England. But after a short chapter on the Pennines and the Alps, we find ourselves wafted off on a scientific expedition to Jan Mayen Island in the Arctic, climbing its great extinct volcano, Mount Beerenberg, with a party whose extreme youth prompted a kindly old lady on the ship going back to remark: "And have you dear boys been hiking?"

Finally we find Scott Russell joining Shipton for surveying and botanical work in the Karakorams. This expedition was cut short by the War, but an amazing amount was accomplished even in half

* The year was 1945. *Himalayan Journal,* XIII (1946), 62, 70-72.

a year. Scott Russell makes us see the country and the people. We breathe the air of the icy passes and follow him back to civilization —so-called.

"Read *Mountain Prospect.* You'll find it different from most books of that sort," said Mrs. George Finch, who has over twenty years' experience of mountain literature. I agree with her heartily and am sure other readers will do the same. Incidentally, the book has a delightful introduction by Geoffrey Winthrop Young.

URSULA CORNING

Kingdom of Adventure: Everest, by James Ramsey Ullman. 402 pages, with illustrations and maps. New York: William Sloane Associates, 1947. $4.75.

This is a uniquely arranged collection of extracts from the standard accounts of the several British expeditions to Everest; it gives the lay reader a bird's-eye view of the entire history of the attempts on this peak. The unique arrangement consists in running extracts of a page or so at a time, from the standard published accounts, each introduced by the name of the author—Mallory, Odell, Somervell, Smythe, *et al.,* all well-known veterans of Everest expeditions—and weaving the whole into a chronological story. To assist the reader, the arranger regularly interposes, after two or three such excerpts, his own comments.

J. E. FISHER

Switzerland and the English, by Arnold Lunn. 258 pages, with 16 pages of illustrations. London: Eyre and Spottiswoode, 1944. 15/-.

Switzerland and the English has not hitherto been reviewed here, though it was published in England in 1944. Inevitably its 14 beautifully illustrated essays are tinged with wartime feelings, but little bitterness colors its expressions of overflowing love for the mountains. As might be expected, Arnold Lunn, a brilliant writer who loads every rift with ore, writes with fluent style and stirring quotations from famous mountain writers. As each of his essays is an entity in itself, there is little continuity in the book; but few readers will find this lack of organization a disadvantage. The book is written for a somewhat limited audience, for those who know something of mountain literature, and of the early days of Alpine climbing and the Alpine Club. Readers will find Mr. Lunn's anec-

dotes of climbing and skiing as delightful as his thoughts are provocative, though some may feel that he overdoes theistic discussions, and others may disagree, for instance, with his prejudices against ancient Greek appreciation of beauty, and Byron, and the use of pitons.

Better locate a copy! *Switzerland and the English* belongs in your mountain library, and it will make you think.

R. H. BATES

Die Schweiz auf alten Karten, by Leo Weisz. 227 pages, with 244 reproductions of maps (some in color), views and instruments, in addition to many unnumbered portraits. Zürich: Verlag der Neuen Zürcher Zeitung, 1945.

No student of Alpine maps can afford to neglect this book, which is one of the most interesting of the Swiss publications available since the end of the war, being comparable in content to Chubb's volume on the atlases of Great Britain. It deals first with maps of Switzerland from ancient times, through the Middle Ages, down to the first printed maps of Waldseemüller and the Strasbourg Ptolemy. This is followed by thorough studies of the maps of Münster, Tschudi and Stumpf, the forefathers of modern Swiss cartography. A further section deals with 16th- and 17th-century map makers, such as Schöpf, Mercator, Hondius, Jansson and Blaeu, who continued to advance the art. A final chapter is devoted to the 18th-century workers—Scheuchzer, Jaillot, Delisle, Walser, Pfyffer, Exchaquet, Weiss and Müller—to all of whom mountaineers are indebted for detailed knowledge of their playground.

J. M. THORINGTON

Glacial Geology and the Pleistocene Epoch, by Richard Foster Flint. 598 pages, with six plates, 88 text figures and 30 tables. New York: John Wiley and Sons, 1947. $6.00.

This is primarily a textbook on Pleistocene glaciation. Richard F. Flint, Professor of Geology in Yale University, has devoted his first 63 pages, divided into four chapters, to glaciers, glacier ice and glacier motion, with reference both to Alpine (valley) glaciers and to ice sheets. It is this portion of the book which is of more particular interest to mountaineers.

J. E. FISHER

VARIOUS NOTES

Accidents in 1947

ON 4 October 1947 the Council voted to form a committee to be called the Safety Committee of the American Alpine Club. Its purpose is to investigate climbing accidents and to formulate a program of prevention for the future. It has been the initial concern of this Committee to gather as many data as possible concerning last summer's unprecedented number of accidents, with no intent to criticize the persons involved, but rather to learn why these accidents occurred and to emphasize the lessons to be learned from them. The fact that mountaineering accidents led to eleven deaths in the five-month period from May through October 1947 is evidence enough that something must be done. Four near-fatal accidents could easily have brought the number to 15—many fewer than the 60-odd deaths reported from the Alps in 1947, but certainly enough to constitute a harsh warning.

The Committee's first report was presented on 6 December 1947. A section devoted to summaries and brief analyses of 13 accidents in 1947 is reprinted below. The introduction to this section concludes thus: "The aim has been to stress only those accidents which were fatal or so nearly fatal as to be worthy of special note. The Committee feels that emphasis on the causes of these accidents will call attention to the full significance of all accidents. If the effort put forth now can save but one life or limb next summer, that effort will, most assuredly, have been well spent."—*Ed.*

Coast Range, British Columbia. On 22 July 1947, in the Mt. Waddington-Tiedemann district of western British Columbia, Charles Shiverick, of the Harvard Mountaineering Club, lost his life in a snow avalanche on the highest peak of Mt. Serra, at about 11,000 ft. A high camp party of four men had made an extended reconnaissance of this peak two days before. They had kicked steps to the top of a long 45-degree snow slope leading to a rock saddle on a ridge of the highest Serra peak. After the reconnaissance, they had descended the same slope to a steep névé basin. The last snow had fallen a week earlier. Snow on the descent was somewhat mushy. The 21st was a brilliant day. On the 22nd the party again

left camp, at 7.00 A.M., for an attempt on Mt. Serra, the plan being to continue the route established on the 20th. While they were ascending the old steps in the basin, they emerged into the sunlight. Three unusually heavy ice (?) avalanches echoed across the valley, probably from Mt. Munday or Mt. Waddington. At about 9.45 A.M., on two ropes, the climbers moved diagonally up and to the right, leaving the old steps to reach the descending track of two days before, still some 250 ft. away. Though by now each man was beginning to sink in six or eight inches, the névé was judged to be fundamentally safe. Fred Beckey was leading, tied to Winchester; King, leading the second rope with Shiverick, was close behind. All were climbing in unison. When they were but a few feet below the rocks supporting the ridge, the whole slope began to slide to a depth of one and a half to two ft., leaving a marked line of cleavage, probably 700 ft. across. The avalanche occurred half an hour after the sun had hit the upper reaches of the slope. The force of the slide was irresistible, tumbling Beckey and Winchester down some 1500 ft. before their rope caught on a pinnacle of ice. King and Shiverick were carried down some 700 ft. to an outcrop of rock which caught their rope. During the slide Shiverick received a blow in the back which injured him internally. He was the only member of the party who wore no pack. Striking the rock island, or the sudden tightening of the rope, may have crushed his ribs or complicated injuries already suffered. He was tied with a single bowline (somewhat loose), unlike the bowline-on-a-coil which the others had used. Beckey suffered several broken ribs, and King a dislocated shoulder; Winchester had lacerated hands and had lost his axe and rucksack.

Immediately after the accident, King dug a snow shelf, placed Shiverick on it, and did as much as possible to make him comfortable. Shiverick was apparently unconscious. King then descended as quickly as possible to meet and help the others. When they were able to climb back to the injured man, they discovered that Shiverick had in some manner dislodged himself from the ledge and had fallen several hundred ft. farther, despite the fact that King had carefully braced him on the ledge with an ice-axe. Several hours were required to transport Shiverick across the slope to a safe ledge, during which time he died.

Source of information: members of the expedition.

Analysis. A careful study of this accident has been made by members of the Harvard Mountaineering Club and American Alpine Club. While it cannot be stated that an error in judgment was not made—the accident was avoidable—the decision to repeat an ascent already accomplished without misadventure was one which, in all probability, would have been made by a majority of more experienced parties. If a lesson is to be learned from this accident it must be that judgment of snow conditions is perhaps the most difficult phase of a mountaineer's training. It is not to be learned in one season and may not be acquired even after many seasons. Few mountaineers attain a working mastery of the subject of snow slope analysis. No better shortcut to an appreciation of the manifold facts of snowcraft is to be found than in the pages of *Snow Structure and Ski Fields* by Gerald Seligman (Macmillan, 1936), and this work should be considered a "must" by all who undertake ascents in terrain characterized by ice and snow.

Northern Cascades: (1) Monte Cristo District. On the morning of 13 September 1947, a party of four young members of the Mountaineers Inc., of Seattle, left Monte Cristo by trail to climb the three Wilmon Spires. According to one of them, "This was a feat never yet done in one day." They climbed the two W. Spires and debated the advisability of going up the E. Spire as it was already between 5.00 and 6.00 P.M. Some of the party felt that it was unwise to go on, but one who had climbed there before assured them that it would go quickly. The climb took longer than they had expected. According to reports, they by-passed three pitons left by an earlier party in places where the stances were questionable. They reached the top after dark. Jim Wells rappelled off last, and at the bottom of the rappel, for undisclosed reasons, untied the belay rope. The end of his 100-ft. rappel was still 12 ft. above a spacy ledge. After pulling the rope down and dropping it to the others, Wells started to climb down the remaining 12 ft. unroped, while the other climbers were coiling the two ropes. Apparently he got into difficulties, and at 8.15 he slipped. The ledge failed to stop his fall. He landed on talus 175 ft. vertically below, and was killed.

Source of information: Seattle Mountaineers rescue personnel.
Analysis. This tragedy demonstrates that the leader, be he

first man up or last man down, must protect himself. This is especially important at night, when it is difficult to see. Of course, anyone who deliberately allows himself to be caught out at night, on difficult terrain, is guilty of the inexcusable. If Wells had worn his belay rope while he was climbing down the last 12 ft., he could have been secured quite easily. All members of the party had taken the Mountaineers' climbing course. Darkness and fatigue from a long, severe day undoubtedly contributed to the fall. Certainly they were over-zealous in trying to climb the three peaks in one day. Here was the place for the leader to say, "Let's try it tomorrow." Here also is an illustration that, while mountaineering clubs can do much to indoctrinate their members in the principles of safety, they can not exercise control over all their actions.

Northern Cascades: (2) Snoqualmie Pass District, Washington. On 14 September 1947 a girl fell from Guye Peak while she was descending unroped, in the dark. She was seriously injured. She had done no previous climbing, and the two others in the party had only slight experience. Apparently they left the pass rather late, were caught on the summit after dark, and descended by night instead of waiting for daybreak. They were not members of the Mountaineers.

Source of information: Seattle Mountaineers.

Analysis: Such a late start violated one of the fundamentals of mountain safety, and to continue on over steep terrain unroped and in the dark was a doubly serious error in judgment. Whether or not accidents of this kind can be minimized by a system of registration at Ranger Stations, or by the placing of signs on trails, is a matter to be considered carefully.

Northern Cascades: (3) Mt. Index, Washington. During the first week of October 1947, there occurred a tragic accident which has not yet been fully explained. Two young men named Franklin and Westphal, each 17 years of age and with a minimum of climbing experience, set out on the normal route up this difficult peak. They had no extra food, and they wore light jackets and lightweight cotton shirts. They carried only 25 ft. of rope. They have not been seen since. Their jackets were found later at a camp beside a lake. The only other traces were a few scattered orange peels at the

bottom of a rock gully leading to some of the most difficult climbing on the established route. Here they must have stopped for lunch. No trace of them has been found elsewhere. Presumably they had not picked the best route. Thick weather blew in on the evening of the day they set out and continued for several days, covering the high country with several ft. of snow. Search parties found as much as five ft. of snow in a chimney above the orange peels, and the gully was being swept with avalanches. We may never know where they died, even though it is far too obvious why.

Sources of information: Newspaper accounts and Seattle Mountaineers search personnel.

Analysis. The previous climbing experience of these two boys was limited to an ascent of one of the easier peaks in the Olympic Mountains a few weeks before. Obviously their training was insufficient to justify such a difficult climb. The storm and attendant cold probably caused them to lose their way. It was very cold the following day. Possibly they fell to their death; perhaps, by spring, their bodies will be found huddled under some tree where they froze in their cotton shirts. Their failure to appreciate the gravity of mountain climbing was evident in their lack of equipment. Twenty-five ft. of rope would be next to useless on an ascent of this type. These men should have been encouraged to join an established mountaineering club in which they could have learned to climb with judgment and security.

Sierra Nevada: (1) Yosemite Valley. On 31 May 1947 Donald Boyd, a 14-year-old boy, was killed by a fall from Sunnyside Bench beneath upper Yosemite Falls. Another boy of the same age was with him. It was evening and getting dark. They had taken a seldom-used shortcut from an upper trail to a lower one above fairly steep cliffs. They had no rope. Boyd slipped and slid to the edge of the Bench; but his fall was stopped by an oak tree and some wild grape vines, from which his companion could not disentangle him. Their cries for help were heard by residents of Government Center, directly below. The Ranger's office was notified, and a Ranger Patrol went to the base of the slope. It was ascertained that there were no injuries, and the boys were instructed to remain where they were until help could arrive. They acknowledged the instructions; but while the Rangers were preparing for the rescue, the second boy came down from the cliff in a semi-hysterical condition. Before

his arrival, the Rangers had planned to reach Boyd by the conventional route to the Bench; but in order to hasten the rescue they made a direct ascent. Boyd was found at the base of the cliff in a critical condition. He had evidently fallen a second time a few minutes before he was found. He died in the hospital of skull and neck injuries.

Sources of information: National Park Service Reports and newspaper accounts.

Analysis. Here is a case of an inexperienced person who did not know what to do when an accident occurred. It was late, and the boys felt obliged to take a shortcut—a direct violation of mountain common sense. A good trail is usually safe, even in the dark. How to make people, especially the inexperienced, stay on a trail, is a difficult problem. Although it may seem that immediate rescue might have saved the boy's life, the effort cannot be criticised. There has been considerable speculation as to whether he fell from the place where he had been left, or tried to rescue himself and fell in the attempt. A study of the locality indicates the latter to have been the case. That both boys failed to follow instructions given by those on hand to help, illustrates the need for speedy rescue operations. Injured persons cannot be relied upon to comply with such instructions.

Sierra Nevada: (2) Cathedral Spires, Yosemite Valley. On 13 July 1947 the president of the Stanford Alpine Club and two of its members were climbing the "Rotten Chimney" on the higher spire. The rock of this chimney would ordinarily be considered safe; but, since this pitch is vertical and in some places overhanging, its somewhat unsound nature requires extreme caution. Al Baxter, 21 years old and weighing 205 lbs., was leading, belayed by the second man, Ulf Ramm-Ericson (weight about 140 lbs.), who was nestled in a secure but unanchored position at the base of the chimney. The leader was also roped directly to the third man, Larry Taylor, who was shifting his position at the time of the fall, and therefore would almost certainly have been pulled off if the second man had failed to hold a fall or if the belaying rope had broken. It seems that Baxter attempted to climb an overhang of a Class 5 pitch without using artificial aid. He attached his rope by carabiner to an old piton at the base of the chimney, ***without testing***

the piton. Thirty ft. above the ledge, and about ten ft. above the piton, he found the climbing so difficult that he "felt better continuing to climb with two hands than stopping to hold on with one and put a piton in with the other." He hoped to reach another old piton a little higher. Without warning, even to himself, he fell and struck the rock with such force that both legs were broken. The belayer held the rope so securely that it did not run. Calculations show that a force of approximately 2000 lbs. was developed. The piton then pulled out so suddenly that the belayer thought the rope had snapped. Although unanchored, the second man was in such an excellent position that he was able to hold the fall with a sitting hip belay, even though the direction of pull had changed 180 degrees. Baxter found himself dangling 30 ft. below on a 700-ft. overhanging cliff.

Excellent rescue technique, which employed a rappel controlled from below* as well as a belay from above, enabled the other men to let Baxter down to the talus, whence a party of Rangers and volunteers, summoned by the two other climbers, transported him to the valley.

Unfortunately, a large part of this operation was conducted in the dark; and two of the Rangers were injured while they were working on the talus, one of them sustaining a broken foot.

Source of information: Sierra Club Mountaineering Committee.

Analysis. Here is powerful evidence that a leader needs to protect himself adequately on difficult rock. Also, it is clear that pitons left by previous parties should never be trusted; they should be removed and driven in again. A leader is not justified in continuing if the difficulty is so great that he cannot place pitons for safety. Again, the margin of safety had been dissipated. A leader must save sufficient energy to retreat if it becomes necessary to do so; certainly he should not, in fatigue, continue upward to a position he hopes will be better. The belayer was not anchored, and the third man was in no position to offer assistance in event of a fall. That the accident did not have more tragic consequences was due to several factors: (1) Baxter struck the cliff feet-first; (2) the belayer was in an exceptionally good position even though he was un-

* "The Carabiner Protected Rappel," *Sierra Club Bulletin,* XXX (1940), 96-98.

anchored; (3) the resiliency and strength of the 7/16-in. nylon rope minimized and absorbed the force exerted on a belay that failed to let the rope run; (4) a bowline-on-a-coil with four coils around his waist, in addition to the resiliency of the nylon, saved Baxter from injury by the rope.

Sierra Nevada: (3) Twin Peaks (8924 ft.), above Lake Tahoe, California. On 14 August 1947 Emmett Pettit, an easterner 23 years old, previously acquainted with a few climbs in the Canadian Rockies, was killed by a fall from a rock face. He was one of a party of six which had started from Tahoe with Hans Reiss as guide. The party had climbed the basin N. of Twin Peaks on easy slopes and was following a trail which led to the summit. Pettit insisted on breaking away from the party, against the objection of the guide, in order to take a shortcut. He stated that he would either return to the trail and catch up with the party, or else join it on the summit. Apparently he attempted to climb an almost vertical rock face alone. Members of the party thought they heard a rock fall on the face and, after waiting for some time on the summit, became alarmed. Having descended to the basin, Pettit's fiancée found his broken body at the base of the cliff. Presumably he had fallen several hundred feet.

Sources of information: newspaper accounts, statements by friends of the victim, and the official report of the U. S. Forest Service.

Analysis. Here is a tragic consequence of climbing alone. It is understood that this was not Pettit's first solo climb. Evidently he was unwilling to take the advice of the guide. Of course, the latter could have made a drastic move, such as calling off the climb. Whether the climber's failure to recognize his limitations, or loose rock on the face he was attempting to climb caused the fatality, cannot be known.

Sierra Nevada: (4) Devil's Slide, San Mateo Sea Cliffs. On 17 August 1947 a local practice group from the Sierra Club was climbing on cliffs of disintegrating granite south of San Francisco. John Hood, leading an unfamiliar route, had placed three pitons for safety. At a point 40 ft. above the belayer, the slope moderated somewhat on unsound rock. At that point, and with no further pitons for protection, he called out, "Falling!" He fell backwards,

turning over in the air. He was too high above the nearest piton to be checked by the rope; and he struck the belayer's ledge on one shoulder and the back of his head, sustaining a severe fracture of the skull from which he died about 16 hours later. The rope prevented a further fall. Telephone calls to experienced Sierra Club rock climbers, the County Hospital and the State Highway Patrol speeded the rescue. According to the attending physician, the injury was so severe that no amount of speed would have saved his life. The reason for the fall is not known.

Source of information: Sierra Club Mountaineering Committee.

Analysis. On careful study, a Sierra Club Committee could find no fault with the climbing and rescue technique employed. It can only be concluded that Hood was so far above his last piton that, even if the rope had come into play, a 40-ft. fall was bound to ensue. Hood was reasonably experienced and had a reputation as a conservative and careful climber; but, since most of his experience, according to reports, had been on the firm rock of Yosemite, he may not have had sufficient appreciation of the danger of unsound rock and of the need for additional care. Perhaps he relaxed his vigilance as the slope eased off, despite the poor quality of the rock, which should have kept him constantly on the alert. Whether the cause of his fall was a simple slip, loss of balance, a jerk from below, or the collapse of a hold, is impossible to determine. One may conclude, however, that his margin of safety was too slim and that more awareness of this might have saved his life.

New Mexico Rocky Mountains: In late October 1947, two girl secretaries from Los Alamos lost their lives on an icy slope of *Truchas Peak* (13,275 ft.), New Mexico's highest mountain. One was 34 years old, the other 35. Having climbed the peak, they were descending late in the afternoon to the point where horses had been left. With them was Sam Martin, whom they had employed as guide. Against his advice, one of the women took a shortcut across a wide expanse of ice (?). After going only a short distance, she fell and slid several hundred ft., cutting her leg and head. The party had no rope. Being unable to move the injured woman without one, the party made her as comfortable as possible; and her companion volunteered to remain with her while Martin went for help. The rescuers arrived shortly before noon the following day

to find the two crushed bodies several hundred ft. below the spot where the guide had last seen them alive.

Source of information: newspaper accounts.

Analysis. Although details of this tragedy are available only from newspaper accounts, several obvious points may be emphasized. Apparently the guide was inadequately qualified, both in experience and in equipment, to undertake the responsibility of leading such a trip. The mention of horses suggests that he may have been a horse guide rather than a mountaineer. Presumably the victims had no knowledge of the mountains. No experienced climber would attempt the crossing of a dangerous and extensive slope without a rope, nor after injury would he move from a secure position before the arrival of a rescue party.

The State Police were called upon to effect the rescue. Before they found the bodies, they returned to civilization to purchase 5000 ft. of rope and other equipment. This would have been an opportunity for a trained and well-organized rescue team from some near-by mountaineering organization. Pain, hunger and exposure may impel injured climbers to further their own rescue. Delay in getting rescue personnel into the field may therefore mean disaster.

Tetons: (1) Symmetry Spire, St. John Massif. In mid-June 1947, a climber, Hans Breu, was making an attempt on one of the cliffs in this district with a companion, George Senner. Breu decided to climb a more difficult pitch than his companion felt qualified to attempt; so he went up it alone. A slip occurred, and the more ambitious climber fell 100 ft. into a tree, which probably saved his life but left him with a chipped ankle. After Senner had notified park authorities, a rescue party brought Breu down in a stretcher.

Source of information: National Park Service and members of rescue expedition.

Analysis. This is another story of an unroped climber. Details are so sparse that only general conclusions can be drawn.

Tetons: (2) *Mount Owen.* On 8 August 1947 Clement Ramsland, an instructor in Public Speaking at the University of Minnesota, fell during a descent *en rappel* from a position above the saddle between Mt. Owen and the East Prong. As first man

down in his party he was using a rappel sling installed the year before. Apparently the strain was too great for the sling. After bouncing down and off the out-sloping ledges for 50 ft., he landed on a platform invisible from above. He suffered a concussion, a cracked elbow, four torn ribs, cuts on his hands, a cracked left leg and a broken left wrist. A rescue party, organized that night and using headlamps to travel by, reached Ramsland at 6.00 A.M. the next morning. With a basket stretcher, they were able to carry him back to camp by nightfall, but not until 22 persons and several pack animals had become involved in the rescue.

Source of information: National Park Service and members of rescue expedition.

Analysis. A cut-and-dried case against using old rappel slings. At least the first man down should have been tied into a safety rope belayed from above. Application of the most elementary principles of safe climbing could have saved a lot of people a lot of trouble. The cost to the Park Service was over $600.

Tetons: (3) Mount Owen. On 24 August 1947 William McIndoe, a park employee 20 years old, fell to a ledge within 40 yds. of the site of the Ramsland accident. This climber had left the valley after a dance the night before, against the advice of friends, to attempt a one-day ascent, climbing alone. Twenty-four hours later, when he had not returned, his friends organized a rescue team to search for him. Concern was great because a severe electric storm had buffeted the peaks during the entire day of his climb. Several rangers went up the next day, the 25th, and discovered that much help was needed. Eventually, a rescue expedition of 14 was organized. Six climbers found the boy's body and brought it out to Amphitheater Lake where horses had been left. Later investigation indicated that McIndoe had not reached the top. He seems to have fallen at least 100 ft. from a point some distance from the normal route. Possibly he lost his way in the storm. It is known that he had previously climbed Teewinot alone and in consequence had been reprimanded by the National Park Service.

Source of information: National Park Service and members of rescue expedition.

Analysis. Another person addicted to solo climbing. Mention of the reprimand leads one to wonder whether restrictions can prevent ill-advised actions. It is conceivable that a reprimand or restriction could be a challenge to an obstinate nature. Evidently a few solo climbs in the Tetons, earlier in the summer, had given this boy unwarranted confidence. He had had no indoctrination whatsoever in the matter of safety.

Appalachian Mountains. On 25 May 1947, in the *Cumberland Plateau* region of Tennessee, an accident occurred to a member of a rock-climbing group from Vanderbilt University. Five of the seven active participants had had previous experience of rock climbing. Dr. Glenn Millikan, to whom the accident occurred, had done a little climbing in Switzerland, England and Wales. His party was climbing on a section of sandstone and conglomerate cliff known as "Buzzard's Roost," near Fall Creek Falls State Park. The climbing is similar to that encountered in the Shawangunk region near Wallkill, New York, although it is on a rock structure somewhat less reliable. After making several quite difficult climbs, Dr. Millikan descended one of the routes and, proposing to climb one of the easier routes near by, called for the rope to be untied from his belayer at the top of the cliff, so that he could pull it down. Since the face was nearly vertical, it was presumed that the rope would fall clear; but apparently the end caught behind a free rock about twice the size of a brick, lying on a narrow ledge. An instant warning shout from the belayer above was too late. Dr. Millikan gave the rope a pull. Standing directly beneath it, he was hit on the head by the dislodged rock and killed.

Source of information: members of climbing party.

Analysis. It might be pointed out that two important precautions were neglected here. First, Dr. Millikan stood directly beneath the rope; and, second, he was not looking up. His momentary lapse may have been due to fatigue. Earlier in the day he had cautioned one of the novice climbers in this regard. It is advisable, in casting down a rope from above, to throw it well clear of any cliff which may catch and hold a loop.

UNITED STATES

First Ascents in the Cascades. In September 1946 Charles Welsh, Jerry O'Neil and Fred Beckey camped in the alpine meadow at Washington Pass, with the bell-shaped N. Peak of Liberty Bell looming above. On the 27th, starting from a gully to the S.W. of the bell, they made a new route to the summit: 100 ft. in the gully; 100-ft. rib to a comfortable ledge; vertical rib (tiny holds) and traverse leftward to small ledge around a corner; short but tricky crack to top of a buttress; easy slabs for a few ft.; then high-angle slab to base of a narrow, overhanging crack (piton); 10-ft. finger traverse ending in a "chin" to a flimsy ledge; then to the right along sloping ledge which turned into another high-angle slab, very much exposed (two pitons); up slab with friction and a jam crack; a scramble, a shoulder stand and another short scramble to summit. Convenient rock projections facilitated 120-ft. rappels in the descent. On the 28th they climbed an unnamed 7600-ft. peak two miles S. of the Pass and also the S. Peak of Liberty Bell by the easy S.W. gully. That afternoon they established a new camp, from which they hoped to scale the unclimbed towers of Snagtooth Ridge. Starting at daybreak on the 29th, they climbed first to the summit of "Big Snagtooth" (8200 ft.): scree slope to ridge at 7800 ft., near S. (higher) end of Snagtooth Ridge; gully and series of ribs on S.W. face of southernmost peak to a false summit; descent of narrow 30-ft. chimney and traverse of a delicate ledge to another false summit; descent to small notch below summit block; shoulder stand past overhang; ascent of delicate slab to summit. By 1.00 P.M. they were ready for more climbs. Two towers (about 8100 ft.) which they called "Cedar Tooth" and "Willow Tooth" required some 200 ft. of moderately difficult rock work. Then a quick reconnaissance showed that there might be a route on the 220-ft. "Red Tooth," most imposing tower on the ridge. By the time they reached the summit, the sun had been hidden in clouds for some hours: V-shaped crack to a small "cannonhole," by scant and crumbly holds, with an overhang about 60 ft. up (pitons); shoulder stand to a chock stone in the notch (piton); to the right on a small ledge, past bulging rock, to a vertical chimney; up the chimney, circumventing loose rocks (piton), to a resting place at 60 ft.; short scramble to summit. Two long rappels (pitons) brought them to the base. They reached camp at dark.

On 18 May 1947 Mel Marcus, Bill Dunaway and Fred Beckey made the first ascent of the W. Peak of Mt. Temple, an 8350-ft. granite tower. This called for several hundred ft. of very tricky and difficult rock climbing, including high-angle slabs, cracks and short overhangs. There is much climbing yet to be accomplished on Temple's half-mile ridge of spectacular towers. Only the highest (E.) peak has been ascended to date.

Mt. Shuksan has been climbed from every conceivable direction but the true N., *i.e.* by the left profile as seen from Mt. Baker Lodge. From White Salmon Ridge the steep ice and rock cliffs rise to an 8600-ft. N. buttress, separated from the 9038-ft. summit by a salient of the Price Glacier. On 21 September 1947 Bob Craig and Fred Beckey made a cross-country jaunt via Shuksan Arm and White Salmon Creek to timberline at the base of the rounded N. face, where they bivouacked. Starting at 6.00 A.M., they climbed to the summit: very exposed traverse eastward to a hanging glacier; up steep ice slopes (crampons) and through a field of crevasses to a very icy finger; up the finger to an ice arête directly above a carefully circumvented rock barrier; over treacherous ice patches and some very loose rock to top of buttress; across a large bergschrund and over névé to E. face of summit pyramid; then difficult vertical climbing (sneakers) to summit at noon. The descent by the regular Lake Ann route took four and a half hours to the Lodge.

FRED BECKEY

The Mountaineers, 1947. The Mountaineers Inc. consists of a main club in Seattle and branches in Tacoma and Everett. The mountain climbing activities of the Seattle club are divided among four groups: Climbers Group, Campcrafters, Summer Outing Group, Ski Mountaineering Group. The Tacoma and Everett branches conduct climbs in their respective areas.

The Climbers started their season of 1947 with the regular climbing course — 14 class room lectures and demonstrations, supplemented by eight field practice trips. One hundred and fifty registered for the courses. Eighty were graduated from the elementary and 40 from the intermediate course. The latter requires two years' participation. The course was followed by a series of climbs, including E. Twin Peak, Chair Peak, Mt. Hood, Big Four, Vesper, Mt. Olympus, Mt. Rainier (46 made the ascent), Cathedral Spire,

Monte Cristo and Cadet. Mt. Olympus requires 18 miles of backpacking. Two trips were made, and 50 completed the ascent. The Climbers divide their large instruction and climbing parties into small groups of three, with an experienced leader or instructor assigned to each unit. This group also conducted a one-week backpacking trip into Cascade Pass, to climb the peaks in that area.

The Campcrafters cover the field of overnight week-end camping and climbing. Their principal week-end climbs were Tomyhoi, Mt. Stuart, Cathedral and a group of eight peaks around Mowich Lake on Labor Day week end. In July a two-week gypsy tour was conducted into Oregon, with about 30 participating. The peaks climbed were Mt. Washington, N. and S. Sisters, Mt. Theilsen, Scott and Bailey.

The 1947 Summer Outing was at Grand Teton National Park. There were 176 participants — the largest number ever handled. The following mountains were climbed: Grand Teton, Middle Teton, St. John, Moran, Nez Perce, Owen, Symmetry Spire, Teewinot, Rock of Ages, Rockchuck and Woodring.

The Ski Mountaineers had four practice trips in ski touring, starting in March. Between May and July 5th they climbed White Horse, St. Helens, Mt. Baker and Mt. Adams on skis. The largest party was 26, on St. Helens.

Tacoma climbing activity was centered on the "Irish Cabin Peaks," a group on the N.W. side of Mt. Rainier. Everett climbs were in the Monte Cristo, Darrington and Index areas. Both branches scheduled climbing courses of their own, with a little help from Seattle.

The Mountaineers sent out rescue squads in connection with two fatal accidents, both on private climbs. One was for Jim Wells, killed by a fall on Wilmon Spire; the other, for two boys lost in a storm on Mt. Index. There were no fatalities on scheduled climbs of the Mountaineers under supervised leadership.

The new Mountaineer Development Group was formed in the latter part of the year. It is taking over the functions of the Climbing Committee and comprises six major committees: Climbing Courses, Leadership Training, Area Development, Safety, Advanced Climbing and Public Enlightenment.

LLOYD ANDERSON

Sierra Club, 1947. The 43rd Annual High Trip, with an attendance of about 100, travelled for four weeks under the leadership of D. R. Brower (A.A.C.) in the central Sierra Nevada, from Banner, Ritter and the Minarets S. over Silver and Seldon Passes and out via Pine Creek Pass in the Mt. Humphreys region. The Base Camp, with an average attendance of 125, under the leadership of Oliver Kehrlein, specialized in intensive exploration of the Palisade region. Their camp, for two periods of two weeks each, was at timberline on the Fifth Lake, below Palisade Glacier. Four Burro Trips of 20 members each, radiating from Kearsarge Pass, gave instruction in the broad phases of mountaineering and exploration of the wilderness. A two-week Knapsack Trip permitted climbing in the Evolution Group, the Devil's Crags and the Palisades.

An official Sierra Club Knapsack party of 23 climbed for two weeks in the Wind River Range.

A private party of Sierra Club members climbed in the Mt. Tiedemann region for approximately three weeks in August. Those participating were Oscar A. Cook, Ulf Ramm-Ericson, Rupert Gates, Robin Hansen, Richard C. Houston, Fletcher E. Hoyt, Fritz Lippmann and Howard Parker. The party made 12 first ascents and reached 17 different summits. A full account will appear in the 1948 annual number of the *Sierra Club Bulletin.*

On the seventh attempt on Mt. Confederation, British Columbia, Ruth and John Mendenhall made the first ascent.

On 2 September 1946 the party of Jack Arnold, Fritz Lippmann, Anton Nelson and Robin Hansen made the first ascent of the Lost Arrow, in Yosemite Valley. Their route involved roping down from the rim to the notch joining the arrow to the wall and then climbing the final difficult spire by means of Prusik knots on a nylon rope brought over the summit. The technique was similar to that used on some of the "unclimbable" needles of the Dolomites. Only normal rock climbing equipment was used, and great credit must be given to the party for their skill and ingenuity in working out the problem. Nevertheless, an ascent by more conventional means from the base of the arrow, without assistance from an upper rope, remained as a great challenge.

On 3 September 1947 Anton Nelson and John Salathe reached the summit 103 hours after leaving the base. For 1200 ft. the average

climbing angle exceeds 80°. By use of specially designed pitons and a number of expansion bolts on the relatively short stretches of flawless 90° granite, they were enabled to complete the entire climb without assistance or protection from above. Their attitude toward the accomplishment is particularly gratifying. Their account of the climb gives no sense of braggadocio or competitive spirit, but simply of an intense fascination in accomplishing an extremely difficult climbing problem. They insist that throughout the climb each was confident that he could hold the other in the event of a fall.*

Two serious accidents marred the Club's long safety record. On 13 July 1947 Al Baxter broke both legs in a long fall on the higher Cathedral Spire. On 17 August 1947 John Hood was killed by a long fall on a local practice climb near San Francisco. Both accidents will be fully reported by the Safety Committee of the American Alpine Club.

R. M. LEONARD

Colorado Mountain Club, 1947. The Colorado Mountain Club enjoyed a very active year, with trips scheduled practically every week end. Skiing trips occupied first place during the winter season and, among the diehards, extended even into early summer. Several members took the last trip of the season on June 29th and reported fine skiing on corn snow from the Trail Ridge Road in Rocky Mountain National Park. The Club sponsors ski classes for beginners and requires members to pass qualifying tests before participating in some winter ski climbs. During the season three of our 14,000-ft. peaks were climbed on regularly scheduled ski trips. A winter outing was held at Steamboat Springs in the first week of March.

Mountaineering training was also carried on. A school for leaders was held in February, and safety was particularly stressed. In June classes in rock climbing were held once a week under competent and qualified instructors, followed by practice on suitable cliffs in the field on Sundays. This course was well patronized,

* For the 1946 ascent, see Anton Nelson, "Climbing the Lost Arrow," *Sierra Club Bulletin*, XXXII (May 1947), 1-10, and Fritz A. Lippmann, "We Climbed the Impossible Peak," *Saturday Evening Post*, 28 June 1947, pp. 20-21, 104, 106, 109-110. The 1947 climb will be reported in the 1948 annual number of the *Sierra Club Bulletin*.

especially by younger members, and produced some excellent material from which we expect to develop our future trip leaders. It will be renewed this spring. The instruction was continued in the School of Mountaineering held in conjunction with the Annual Summer Outing, which was located at the head of Noname Creek in the Needle Mountains of the San Juan Range from July 21st to August 3rd. This is an area of high, rugged peaks, 13,500 to over 14,000 ft. in altitude, with climbs ranging from moderately to extremely difficult. There is plenty of opportunity to develop new routes.

Various Club members went farther afield. Some climbed in the Tetons and Wind Rivers, and in December 1946 five journeyed to Mexico and climbed Orizaba and Popocatepetl. Four of these are also members of the A.A.C.: Dr. John V. Ambler, Carl Melzer, Herb Hollister and Carl Blaurock. Herb Hollister, Jr., a lad of 14, was the fifth in the party; he will probably be a future candidate for membership in the A.A.C. Hollister, Sr., Roy Murchison and Evelyn Runnette completed climbing all 52 peaks of the state exceeding 14,000 ft. We now have 20 members who have done so.

C. A. Blaurock

Sawtooth Outing of the Iowa Mountaineers. The Iowa Mountaineers of the State University of Iowa spent three weeks of August 1947 in the Sawtooth Range of Idaho. Sixty-four members participated. Base camp was on Little Redfish Lake, and high camps at the foot of Mt. Heyburn and in the cirque at the foot of Mt. Thompson.

Ten peaks rising from the horseshoe ridge around the Thompson high camp were ascended and named. Eight of the climbs were first ascents. Two climbing parties travelled from the Thompson camp by different routes through the back-regions to the Heyburn camp. On the way they climbed three of the highest peaks on the ridges they passed and also Mt. Warbonnet. Three of these climbs were first ascents. Mt. Heyburn was climbed by two parties of five members each almost simultaneously, via the S. ridge and N. face. The S. ridge climbers reached the summit first, completing what was apparently the third ascent of the peak. Both parties descended via the N. face and then ascended the highest point on the ridge.

The next day eleven members again ascended Heyburn via the N. face.

Quite a few mountaintop and aerial photographs were taken. It is hoped that they will make possible the drawing of a sketch map rather more accurate and usable than the existing ones of the Sawtooth region.

S. J. EBERT

Chicago Mountaineering Club, 1947. The Needle Mountains of the San Juan Range, in southwestern Colorado, was the location for the 2nd Annual Outing of the Chicago Mountaineering Club, 5-16 August 1947. Thirty-eight members and guests met in Durango, Colorado, on August 4th, and on the following day were transported by the narrow-gauge Denver and Rio Grande train about 37 miles up the Animas Canyon to Noname Creek (8400 ft.). The crossing was effected by means of a small tram car running Tyrolean-traverse fashion on a permanently installed steel cable. Two pack strings carried gear and food supplies up the Noname Creek trail to base camp, six miles distant. This trail, which rises 1500 ft. in the first mile and a half, is in fair condition; but it is very difficult for heavily loaded horses in wet weather.

The campsite (10,750 ft.) in Noname Basin was the same one used by the Colorado Mountain Club, which had conducted its own outing during the previous two weeks. The Coloradans generously left their kitchen and mess tents and general camp and cooking equipment for our use. The location proved ideal for climbing. Four 14,000-ft. summits and more than 15 peaks in the 13,000- to 14,000-ft. range were within a few miles of camp.

Peaks ascended were Heisspitz (13,251 ft.), Heisspitz Ridge (13,400 ft.), Jagged Mountain (13,829 ft.), Peak 10 (13,400 ft.), Knifepoint (13,200 ft.), Sunlight (14,053 ft.), Windom (14,084 ft.), Needle Ridge (13,400 ft.), Peak 11, Glacier Point, Eolus (14,079 ft.), N. Eolus (14,030 ft.), Turret (13,819 ft.), Peak 12 (13,100 ft.), Monitor (13,703 ft.), Peak 13 (Scepter: 13,800 ft.), Animas (13,850 ft.), and the Twin Thumbs (13,500 ft.). So far as is known, new routes were established on two ascents: the 1200-ft. E. face of Monitor, by Joe Stettner (leader in this ascent and also in the Outing), Jack Fralick and John Speck; and the Needle Ridge, which has been traversed several times in the past from E. to W. but never before

from W. to E. Climbers were Joe Stettner, Margurette Sharp, Donald Gruber and Edmund Lowe. An ascent of the N. Thumb of the Twin Thumb group via the N. face of the E. ridge was thought at first to be a new route, but notes in *Trail and Timberline* for November 1933 indicate that this line probably was followed on August 4th of that year. An initial attempt to gain the summit was made up a couloir just to the E. of the Thumb's N. ridge, but was abandoned on account of excessive loose rock. A short descent and an eastward traverse out of the couloir, of about 150 ft., placed the party at the base of the E. ridge, which is, in effect, the Peak 11-Twin Thumb col. A short but steep rock scramble to the ridge summit was followed by a 40-ft. rappel on the S. face. A short traverse westward brought the climbers to the S.E. base of the last simple summit rocks. The ascent was made by Joe Stettner, Edith Stettner, Alma Eberli, Max Eberli and Arthur Tielsch.

There is little doubt that all the major peaks in this area have been ascended, but numerous gendarmes and pinnacles have yet to be climbed. Also, there is an almost unlimited field for new routes. The Needles are quite steep, being considered by the U.S. Geological Survey "the most vertical topography in the United States." The rock is of a disintegrated character and constitutes some hazard. Considerable rainfall and the profuse growth of moss and mushrooms may indicate that much precipitation is a regular feature.

HARRY LUMBY

Appalachian Mountain Club, 1947. The Appalachian Mountain Club sponsored the usual number of climbing trips during the past year. Many ski excursions were run during the winter, and also a winter climbing trip was held for a week in the Waterville Valley of the White Mountains. As usual, a fairly extensive program of rock climbing trips was carried out, both to train men and women for climbs in the higher ranges of the west and for local recreational purposes. Unfortunately, a climbing trip planned for the northern Cascades of Washington, N. of Lake Chelan, had to be called off because of lack of registrations.

K. A. HENDERSON

Mountaineering at Harvard. The Harvard Mountaineering Club is unique among college mountaineering clubs in this country

in that it is the only one of long existence and achievement. The greatest accomplishments in the past have usually been achieved by the more experienced graduate members, but most of the Club's activities are carried on by undergraduates. The Club's greatest task is the training of its younger members in the techniques, skills and precautionary measures proper to the rock and ice climber. This training is necessarily carried out on the mountains and cliffs of New England, which, although limited in magnitude, offer considerable variety for practice. During the academic year the Club tries to take advantage of all that New England has to offer. In early fall the easier climbs in local quarries and on small cliffs near Boston are emphasized for the benefit of prospective new members, but before the first snows the new members have advanced to the longer and more interesting climbs of New Hampshire—Joe English, Cannon, Cathedral and Washington, to mention only a few. In the winter the Club's cabin on Mt. Washington serves as a base for snow and ice climbing. With spring comes more rock climbing.

Every summer sees several expeditions or groups of more advanced climbers taking off for the "big" mountains where accumulated skills can really be put to the test and new experience can be added. In the summer of 1947 the Club ran an expedition into the Coast Range of British Columbia and made 23 first ascents. One of the undergraduates accompanied Senior Members Henry S. Hall, Jr., and Noel E. Odell into the Lloyd George Mountains. Others joined the A.C.C. in the Selkirks. Still others climbed in the Tetons, Cascades, Sierra Nevada and Alps, and in Mexico.

W. Lawrence Miner, Jr.

Dartmouth Mountaineering Club, 1947. During the first two weeks of July 1947, six members of the Dartmouth Mountaineering Club packed into the Wind River Range for an attempt on Gannett Peak. Unusually deep snow on the Dinwoody and Gannett Glaciers made progress slow. The attempt was unsuccessful, and attention was focused on the smaller peaks in the area. The range was entered from the E., and horses were used to pack supplies all but the last seven miles below base camp at the forks of Dinwoody Creek.

Two of the members then proceeded to the Canadian Rockies, while the rest dispersed in the Tetons. Ascents were made of Nez Perce, Teewinot, Owen, St. Johns, Moran, and South, Middle and Grand Tetons.

Under the auspices of the Club, Merrill McLane and Henry Coulter published a climbing guidebook to the Tetons.

CLAUDE H. VENON

First Year of the Yale Mountaineering Club. On 1 May 1947 the Yale Mountaineering Club became an official organization recognized by the University. During the rest of the academic year, the Club's activities were limited in scope. Every week end, at least a few Yale climbers could be seen working up one or other of the many interesting routes on the Sleeping Giant's chin. Twice members joined the Connecticut A.M.C. chapter in its climbing activities. The Club was fortunate also in obtaining one of their prominent members to lead a climb on Mt. Carmel. Mountaineering during the summer months was conducted on an individual basis. Yale mountaineers participated in outstanding climbs in Washington, Oregon and Colorado, and in British Columbia with the Harvard Mountaineering Club.

A major accomplishment in the fall of 1947 was the organization of a climbing course similar to that offered by the Seattle Mountaineers. It is divided into elementary, intermediate and advanced phases. The elementary course given in the fall of 1947 included lectures as well as demonstrations and practice in the field. Supplementing the instruction by experienced members of the Club were occasional lectures by prominent mountaineers, including one by Robert H. Bates on "Campcraft," illustrated by slides of the 1942 Army McKinley Expedition and colored movies of the 1938 Mt. Hayes Expedition.

During its six months of formal existence, the Club has grown to include 44 Active, two Alumni and two Corresponding Members.

RICHARD G. MERRITT

Princeton Outing Club. The recently established Princeton Outing Club, though interested primarily in skiing, includes a small group of members who have taken to rock climbing under the

supervision of Weir Stewart, William Douglas and Bruce Hall, who were instructors at Camp Hale.

ALAN W. LUKENS

CANADA

Glacier Camp of the A.A.C. The 1947 camp of the Alpine Club of Canada was held at Glacier from July 13th to July 26th. It was located on the old Canadian Pacific Railway Glacier House site, as were the Sir Donald Camp of 1932 and the Arthur O. Wheeler Camp of 1941. A fly camp was established at the new Hermit Hut, for climbs of Tupper, Rogers and the Swiss Peaks, and bivouac camps on the Sir Donald trail and at Sapphire Col. Good weather prevailed. Ascents were made of the following peaks: Abbott by 216 persons in 12 parties; Afton by 26 persons in two parties; Avalanche by 45 persons in six parties; Bonney by eight persons in three parties; Castor and Pollux by 64 persons in five parties; Cheops by 18 persons in four parties; Cyprian (second ascent) by three persons in one party; Eagle by 48 persons in five parties; Greens Peak by five persons in one party; Macdonald by three persons in one party; Rogers by five persons in one party; Sir Donald by 34 persons in eight parties; Swanzy by eight persons in three parties; Swiss Peaks by ten persons in one party; Terminal Peak by four persons in one party; Tupper by 95 persons in 13 parties; and Uto by 16 persons in three parties. The total attendance at the camp was 179. As usual, the A.A.C. was well represented. Our members were fortunate in the hospitality of their Canadian hosts and in the opportunity to become acquainted with the Selkirks.

On July 20th the Arthur O. Wheeler Hut was opened, as the November *Gazette* of the A.C.C. says, "under the most auspicious circumstances." Another happy occasion was when Honorary Life Memberships were conferred on the three Swiss guides, Rudolph Aemmer, Edward Feuz and Ernest Feuz.

First Ascents in the Canadian Rockies. The first ascent of Mt. Sparrowhawk was accomplished on 24 May 1947, via Kananaskis Valley, by R. Hind, L. Parker, and Mr. and Mrs. H. H. Rans.

It is reported that the first ascent of Brussels Peak was made in 1946, and that the climb was repeated in 1947.

Yoho-Waputik Icefield. The Guidebook describes inadequately the southern portion of the Yoho-Waputik group containing the approaches to and routes on Mts. Niles and Daly.

Trail to Sherbrooke Lake starts from the highway immediately W. of the Wapta bungalow camp, the lake being reached easily in one hour. Mts. Niles and Daly are then in view to the N., while Cathedral Crags and Mt. Stephen rise to the S.W. across the valley of the Kicking Horse. The lake is skirted on the E. The trail enters forest and rises abruptly along the edge of Sherbrooke Creek to the open plateau in which the main stream is joined by its E. branch, Niles Creek. Near this point Christian Häsler was attacked by a grizzly in 1939, and elk are often seen here. Niles Creek is crossed by a small log bridge, and the trail continues across willow-flats to the N.W. corner, where a green glade marks the site of the A.C.C. camp of 1911.

An excellent new graded trail (1938) continues beyond, following the E. side of Sherbrooke Creek and rising steeply for 1000 ft. to campsite at timberline, one mile S. of the col between Mt. Niles and an unnamed summit immediately W. This unnamed point (8700 ft.) is just E. of Yoho E. station (8368 ft.) and forms part of the S. retaining wall of Daly Glacier. S. of the unnamed peak there is a gap in the ridge extending S. to Mt. Ogden, through which the trail may later be extended to drop down to Yoho River opposite the bungalow camp. This gap is the route by which big game coming from the Blaeberry and Little Yoho reach Sherbrooke Creek.

S. of this gap, the rock summit (8850 ft.) two miles N. of Mt. Ogden is the point ascended by Fraser and E. Feuz, Jr., in 1934. The tremendous eastern slabs of this escarpment are noteworthy.

About 100 yards S. of the campsite is a platform cut out of the timber at the edge of a cliff. From here one can look down Sherbrooke Creek and through the valley of Cataract Brook to the Lake Louise peaks, the Victoria N. Peak and Mt. Huber being particularly impressive.

The col (8300 ft.), which should be called Sherbrooke Pass, W. of Mt. Niles and leading over to Daly Glacier, is reached in one hour from the Sherbrooke campsite, and Mt. Niles ascended in two hours more. The same route is attained, but less readily, from Yoho Valley, by crossing the river at Takakkaw Falls and ascending the

buttress immediately S. to gain the Daly Glacier. This col is also a direct route to Mt. Balfour, Daly Glacier being crossed to the Waputik field and the S.E. snow ridge.

The Niles-Daly col (Niles Pass: 8700 ft.), E. of Mt. Niles, connects Niles Glacier with Daly Glacier and offers the most direct route to Mt. Daly (four hrs.), also attainable at this point by the longer Yoho approach. From the Sherbrooke campsite, graded trail rises for several hundred ft. to open scree on which one contours around the S. base of Mt. Niles to Niles Glacier and the pass. This is also the most direct route to Mt. Lilliput, although it was not followed in the original ascent (1940). There is nothing exciting in the Daly "grind" except the cornices, which grandly overhang Bath Glacier, and the view down Bow Valley to Banff. The traverse of Mt. Daly from the highest point over its N. ridge, however, is of considerable length and difficulty; it does not appear to have been repeated since it was made (1904?) by Miss Benham and G. Feuz.

Mts. Niles and Daly are nevertheless magnificent viewpoints, particularly of the Purcells N. of the Bugaboo summits and of the Purcells from the Battle group to Mt. Sir Sandford. We have not seen elsewhere recorded that Emerald Lake is visible from Mt. Niles, being seen through Yoho Pass.

J. M. Thorington

Europe

Accidents in the Alps. It is with profound regret that we here report the loss in 1947 of three distinguished younger members of the Alpine Club (London). J. E. Q. Barford, Honorary Secretary of the British Mountaineering Council and author of *Climbing in Britain,* died in an accident on the Col de la Coste Rouge on July 23rd. J. R. Jenkins and H. E. Kretschmer were killed on August 7th, during a descent of Mont Blanc by the old Brenva route.

Eiger. The second and third conquests of the Nordwand were recorded during the summer of 1947. Two French guides, Louis Lachenal, of Annecy, and Lionel Terray, of Chamonix, made the ascent in July, between 2.00 P.M. on the 14th and 2.25 P.M. on the

16th, following the route of the German-Austrian party of 1938. The first Swiss ascent was accomplished on August 4th and 5th, by Gottfried Jermann and the guides Karl and Hans Schlunegger, of Wengen.*

Asia

Probing the Mystery. Bradford Washburn set out late in January 1948 with an expedition planning to spend six weeks in aerial photographic exploration of the Amne Machin Mountains. We hope to include full details in our next number—and to learn at last whether there is indeed a summit higher than Everest.

Reports via London. The *Alpine Journal* for November 1947 reports an attempt on Rakaposhi by a party consisting of Messrs. C. H. Secord and H. W. Tilman and Herren Gyr and Kappeler, and the subsequent attainment by Messrs. Tilman and Shipton of the summit dome of Mustagh Ata, at over 24,000 ft.

Swiss in Garhwal. A Swiss expedition visited Garhwal in 1947 under the leadership of André Roch. Other members of the party were Mme. Annalies Lohner, René Dittert, Alfred Sutter and Alexander Graven. A base camp was established at the terminus of Gangotri Glacier on June 11th. Six first ascents were achieved: "White Dome" (6830 m.), June 25th, in the course of the party's second attempt on Kedarnath; Kedarnath itself (6940 m.), July 11th; Satopanth (7012 m.), August 1st, by the N.E. arête; Kalindi Peak (6102 m.), August 14th; Balbala (6416 m.), on the Tibetan frontier, August 25th; and Nanda Ghunti (6309 m.), September 11th. The expedition returned to Switzerland in October.**

Pamirs. A Moscow dispatch dated 17 December 1947 reports that two previously unnamed peaks in the Northwestern Pamirs have been climbed and named. One (6400 m.) now commemorates the Thirtieth Anniversary of the Soviet Revolution; the other (7000 m.) is called Moscow Peak.

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* *Die Alpen,* XXIII (August 1947), 195; (September 1947), 214. *Alpinisme* (September 1947), 236.

** For an account of the expedition's plans, with many citations of references, see Robert Fazy, "Expédition suisse au Garhwal, 1947," *Die Alpen,* XXIII (July 1947), 275-80. Subsequent issues carry reports of progress. See also *Alpinisme* (December 1947), p. 270, and *Life,* 15 December 1947, pp. 145-48, 151-52.

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All communications should be addressed to the Club Rooms. Back numbers of most issues of the American Alpine Journal may be had on application. The price of the current issue is $2.00 per copy.

Material for publication should reach the Editors not later than October 1. Information concerning possible articles and notes should be forwarded to the Editors at the earliest opportunity.

FORM OF BEQUEST

I do hereby give and bequeath to the American Alpine Club, 113 East 90th Street, New York City.....